SCHMIDT

EIGHTVOICE POLYPHONIC SYNTHESIZER

USER MANUAL

VERS. 1.0

powered by

:e:m:c:

electronic music components

IMPORTANT SAFETY INSTRUCTIONS

WARNING – When using electric products, basic precautions should always be followed, including the following:

1) Read all the instructions before using the product.

2) Do not use this product near water – for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool or the like.

3) This product should be used only with a cart or stand that is recommended by the manufacturer.

4) This product, in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable. If you experience any hearing loss or ringing in your ears, you should consult an audiologist.

5) The product should be located so that its location does not interfere with its proper ventilation.

6) The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat.

7) The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.

8) The power-supply cord of the product should be unplugged from the outlet when left unused for a long period of time.

9) Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

10) The product should be serviced by qualified personnel when:
- a) The power-supply cord or the plug has been damaged; or
- b) Objects have fallen, or liquid has been spilled onto the product; or
- c) The product has been exposed to rain; or
- d) The product does not appear to operate normally or exhibits a marked change in performance; or
- e) The product has been dropped or the enclosure damaged.

11) Do not attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.

DANGER: INSTRUCTIONS PERTAINING TO RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS: Do not open the chassis. There are no user serviceable parts inside. Refer all servicing to qualified personnel only.

GROUNDING INSTRUCTIONS:
This product must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electrical current to reduce the risk of electric shock. This product is equipped with a cord having an equipment grounding connector and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER – Improper connection of the equipment-grounding connector can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with this product – if it will not fit in the outlet, have a proper outlet installed by a qualified electrician.

SAVE THESE INSTRUCTIONS

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INTRODUCTION

WHO IS SCHMIDT? (”SH-MITT“)

In an ideal world, Schmidt is the synthesizer you have always been dreaming of. Well, anyway, this is the synthesizer Mr. Stefan Smith, err, Schmidt – the creator of Schmidt – has always dreamed of. And – again in an ideal world – you and Mr. Schmidt are sharing the same dream (in terms of synthesizers, of course). However, your new Schmidt synthesizer is a very personal and very special affair. It is the vision of an engineer dedicated to sound, conceived and perfected in close collaboration with musicians and music producers alike, brought to live in the most uncompromising way imaginable. Now this dream has finally come true and is right here in front of you within an arm‘s reach – congratulations if this arm is yours! Of course, Mr Schmidt and everybody else who has had the pleasure of having been involved in turning this dream into reality, would like to say a big „Thank you!“ to you. We all hope that your new Schmidt synthesizer will serve you as a creative, inspirational musical instrument for many years to come.

SCHMIDT‘S SKILLS

Schmidt‘s sound generation engine features virtually everything that subtractive synthesis is endowed with – and even more so: The Oscillator section offers functions to shape very complex sounds with that probably have never been available in the analog domain thus far. The powerful filter section Schmidt offers is like a fully programmable modular synthesizer system. You have plenty of modulation routings that excel even your wildest dreams – and rest assured, we know that synthesizer players like you tend to have really wild dreams. Sometimes, you even get up late at night to tweak some controls, don‘t you? See, this is how well we know you!

USER MANUAL CONVENTIONS

In this manual we use some format conventions, hoping to make things a lot clearer. You will find the following formats:

- **Cutoff** represents a physical control on Schmidt‘s panel you are asked to work on.
- ***Space*** represents a parameter name.
- ***ON*** represents a parameter value/state that is indicated either by a lit LED or as data readout on Schmidt‘s LCD. We take it you know that „LED“ stands for „light-emitting diode“ whereas „LCD“ means „liquid crystal display“. We thought we should point this out though as these terms keep popping up throughout the text.

Represents some important note. It is so important we do not even know as yet what it is. Further reading seems thus recommended!

Sometimes you will be asked to perform a certain sequence of steps. Such a sequence looks e.g. like this:

1 - Select **Ramp** = ”***CLK***” on both LFOs.
2 - Select any waveshape (”**LFO MODE**”) on LFO VCF 1. This setting, in combination with the LFO 1 Rate setting, determines the waveshape that modulates VCF 1.
3 - Select desired waveshape of LFO VCF 2. This setting, in combination with the LFO 2 Rate setting, determines the waveshape that modulates VCF 2.
4 - Hit **Ramp** in LFO VCF 2 again. The „**Special**“ LED lights up and indicates that both LFOs are now running in sync.
5 - Alter **Mode** (waveshape), **Rate** and **Time** settings of both LFOs as you please.

We tried to keep this user manual as compact as possible. That‘s why we deliberately avoided descriptions of synthesizer basics. If you are new to synthesizer technology and sound generation in general, we advise you to go on a quest for some secondary literature that you can find on the web or in specialist magazines, like e.g. Keyboard Magazin or Sound On Sound. Always a good read are classic books like those written by Allen Strange, Devarahi, Beaver & Krause, or others.

I.

PREPARATIONS

PREPARATIONS

UNPACKING

Schmidt was delivered to you in a custom-made high-quality flight case. Every time you take Schmidt with you on the road or to recording sessions, using this tailor-made case is recommended since it is the only adequate way to keep Schmidt really save from harm and the rigors of traveling. In a pinch, it serves well as a bench or doorstop, too.

When unpacking Schmidt, please take its relatively high weight (tipping the scales at about 35 kg / 70 lbs) into account – actually, it is really heavy. Shifting Schmidt by two people is a wise thing to do unless you are keen on hernia. People with Polymoog or CS80 experience will probably shrug this caveat off with a smile but don‘t say we didn‘t warn you.

Because of Schmidt‘s high weight you should carefully pick an adequately robust support or table as well. Make sure the support / table is large and sturdy enough to carry Schmidt safely, even during your wildest keyboard performances. Beer crates – full or empty – will not do a proper job… at least not on the synthesizer – but perhaps on your performance. Feel free to share yourself with us.

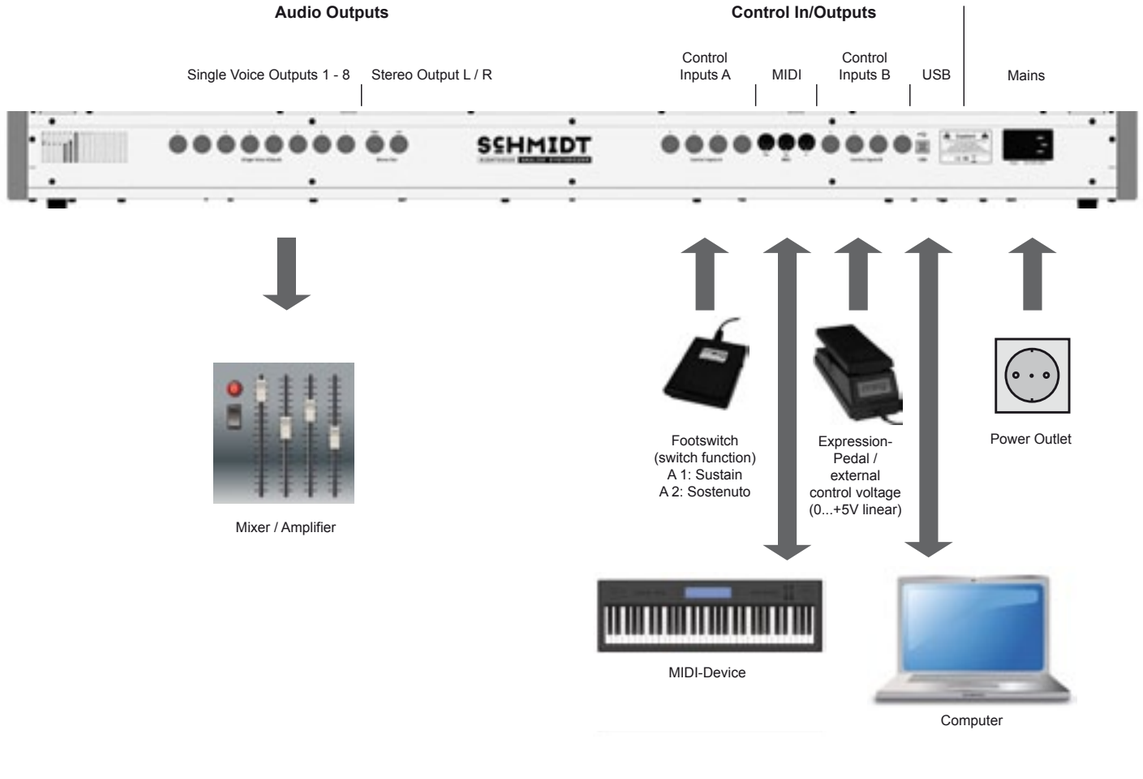
Please make sure the ventilation grills on Schmidt‘s rear panel are not obstructed. There is a lot of electronics inside, and be sure we did our best to keep those little electrons busy all the time and bring them out in a sweat!

ADJUSTING THE FRONT PANEL

Schmidt‘s front panel can be adjusted to various angles. Raise or lower the front panel and the front panel support as you feel most comfortable with. Make sure the support locks safely into the recesses on the underside of the front panel.

Lock front panel support here

CONNECTIONS



Power

Connect the mains socket to the power outlet. Schmidt works with voltages ranging from 110VAC to 240VAC and can be connected to any power outlet all over the world. If that isn‘t true internationalism, we don‘t know what is.

Headphones

Connect stereo headphones to the Phones socket on the left of the panel. You can control its volume independently, using the **Phones** control. Be careful not to blow your eardrums.

Audio Outputs

All audio outs are 6.3 mm (1/4“) unbalanced jacks sporting line level.

Stereo Output L / R:

Provides the stereo master output signal. Level is governed by the **Volume** control.

Single Voice Output 1 – 8:

Taps the signals of all eight voices individually. The routing of voices 1 to 8 to outputs 1 to 8 is preset in hardware. Their respective output level is also preset and independent of the **Volume** control setting.

MIDI

DIN sockets:

Transmits and receives MIDI data. See section ”Global / System / MIDI“ on page 69 for further information. Incoming data on MIDI IN is put through to MIDI THROUGH socket.

USB:

Same function as MIDI IN / OUT sockets.

A Utility menu determines whether Schmidt will receive MIDI data through its USB port or through the MIDI DIN sockets. Please refer to page 68 ”Global Functions / Utility menu / USB/MIDI select“.

Control Inputs

These inputs can be used to control various functions in real-time. They can be assigned to specific parameters, and boy, does Schmidt have many parameters (just in case you haven‘t noticed yet).

For instant Joe Zawinul renditions, the next bit is for you:

Control Inputs A 1 - 4:

Connect up to four footswitches here to control up to four on/off or toggle functions. The assignment procedure will be covered later as there are various types of footswitches around that all have different types of polarity, latched operation etc.

- Control input A 1 provides a Sustain function.
- Control input A 2 provides a Sostenuto function.
- Control inputs A 3 and A 4 can be assigned to several functions (not yet implemented!)

Control Inputs B 1 – 4:

Connect up to four expression pedals or external control voltages here to control up to four parameter values continuously. The assignment procedure will also be covered later on page 54, section „Performance Controllers“. These inputs accept voltages from 0V to +5V.

- Control inputs B 1 to B 3 can be assigned to several functions.
- Control input B 4 provides a volume control function.

Warning: Never exceed the external control voltages of +5V or serious damages may occur!

These features will not only keep your fingers busy but also your feet. Make your band‘s guitarist look pathetic while you are stomping away on your Schmidt pedal board. But do not try to sling Schmidt around your neck while you are at it…

FIRST ENCOUNTER

We suppose you are by now hot on getting a first impression of Schmidt other than a visual one. This is how to get some sounds out of Schmidt without the bother. All explanations concerning ”why, when, and what“ will be covered later. Enjoy yourself, get carried away... but please do not forget to continue reading this manual some time later. We know it is hard but…

POWERING UP

Bring Schmidt to live using the **Power** switch on the rear panel. Schmidt will be idle for about three seconds while booting. Once he is done with that, he is eagerly waiting for your input.

Warning: Handle Volume and Phones controls very carefully. Schmidt can produce excessive levels that could possibly be harmful to your hearing – or your cat!

LISTENING TO PRESETS

Schmidt has a memory capacity of 1024 internal sound settings, called Presets. A distinction has to be made between Single and Multi presets. In Single Mode, Schmidt produces one sound at a time, the same all across the entire keyboard. In Multi Mode, Schmidt is capable of producing up to eight different sounds at a time that can be stacked, layered or divided across the keyboard. All presets are easily controlled and managed using the Edit and Preset sections in the lower right corner of the front panel.

After powering up, Schmidt is in Preset Load Mode which allows for immediate access to the presets. Have a look at the Preset / Edit / Global sections in the lower right corner of the front panel.

Preset
Single/Multi-Presets load, save, name, compare

Loading Single Presets:

1 - Hit **Mode** until the ***SINGLE*** LED lights up.
2 - Hit **Preset up/down** or turn **Value** control to step/scroll through the Single presets. The **LCD** (liquid crystal display, you remember?) shows bank number as well as preset number and name.
3 - Hit **Enter** to load the selected Single preset.

Hit the **Quick Load** key to enable the Quick Load option. Now you do not need to hit Enter anymore to load a selected preset.

Hit **Bank** up/down to select the Single preset bank. The Quick Load option also works for bank selection.

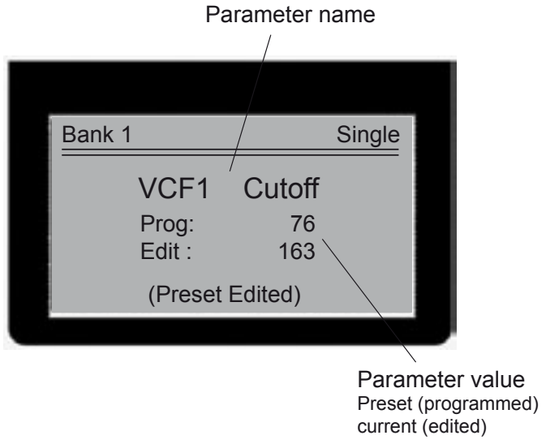
Adjust the **Phones** and/or **Volume** controls to a comfortable listening volume. Again, take care of your ears (”huh, whatcha sayin‘?“).

Use **joystick**, **pitch** and **modulation wheels** as desired but please bear in mind that not every preset necessarily makes use of these. The complete set of functions of the left-hand panel will be covered on page 59, section Real Time Controllers.

Tweaking Presets

Unlock the front panel settings by hitting **Edit Enable** to tweak presets. Simply reload the preset to return to the version previously stored in memory. Of course you can store edited presets. The store function will be covered later.

As soon as you turn a control or hit a switch, the **LCD** will show the name of the corresponding parameter as well as the value stored in memory and the edited value for about three seconds. After that, the screen will return to its normal state.



Loading Multi Presets:

1- Hit **Mode** until the ***MULTI*** LED lights up.
2 - Hit **Preset up/down** or turn **Value** control to step/scroll through the Multi presets.
3 - Hit **Enter** to load the selected Multi preset.

Hit **Quick Load** to enable Quick Load option. Now you do not need to hit Enter anymore to load the selected preset.

Hit **Bank up/down** to select the Multi preset bank. The Quick Load option also works for bank selection.

II.

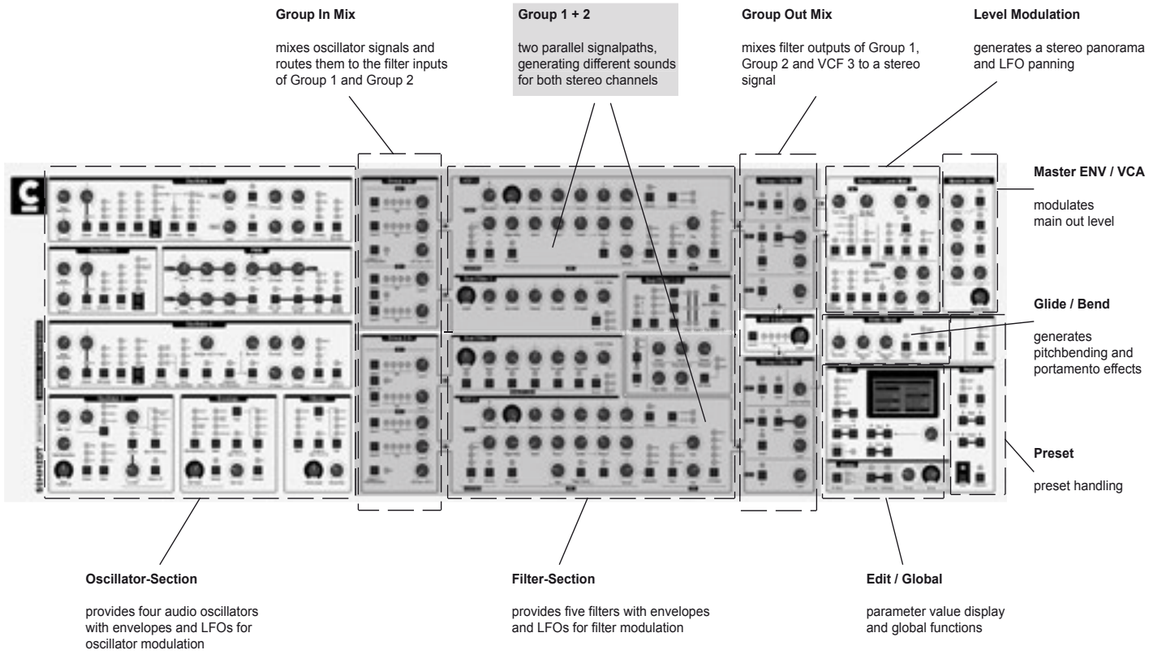
FUNCTION OVERVIEW

FUNCTION OVERVIEW

Now that you have got a vague idea of how impressive Schmidt can sound, you might be curious to learn more about its inner secrets. In this section, you will – step by step – find out about Schmidt‘s features and what is going on under the hood of your new mighty synthesizer.

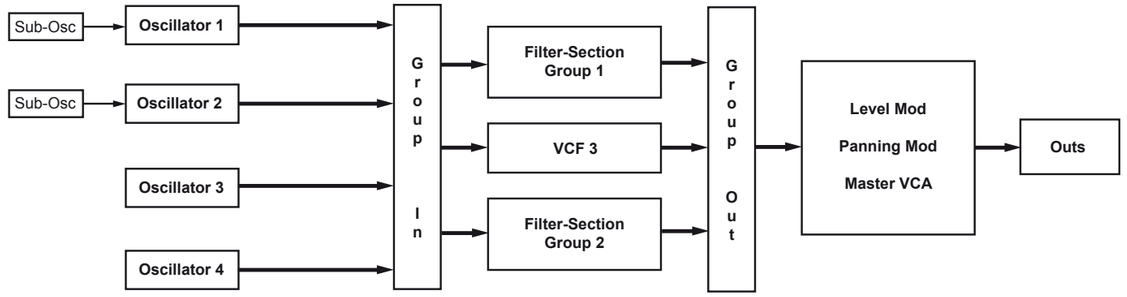
FRONTPANEL LAYOUT

On the **frontpanel**, you will find all the sections spread out in front of you from left to right, according to the signal path. About 95% of the sound generation functions can be accessed without using the LCD and menus. That means, even though it is quite a complex beast, Schmidt is pretty intuitive to work on once you are familiar with the way its functions are organized and accessed.


Group In Mix
mixes oscillator signals and routes them to the filter inputs of Group 1 and Group 2
Group 1 + 2
two parallel signalpaths, generating different sounds for both stereo channels
Group Out Mix
mixes filter outputs of Group 1, Group 2 and VCF 3 to a stereo signal
Level Modulation
generates a stereo panorama and LFO panning
Master ENV / VCA
modulates main out level
Glide / Bend
generates pitchbending and portamento effects
Preset
preset handling
Oscillator-Section
provides four audio oscillators with envelopes and LFOs for oscillator modulation
Filter-Section
provides five filters with envelopes and LFOs for filter modulation
Edit / Global
parameter value display and global functions

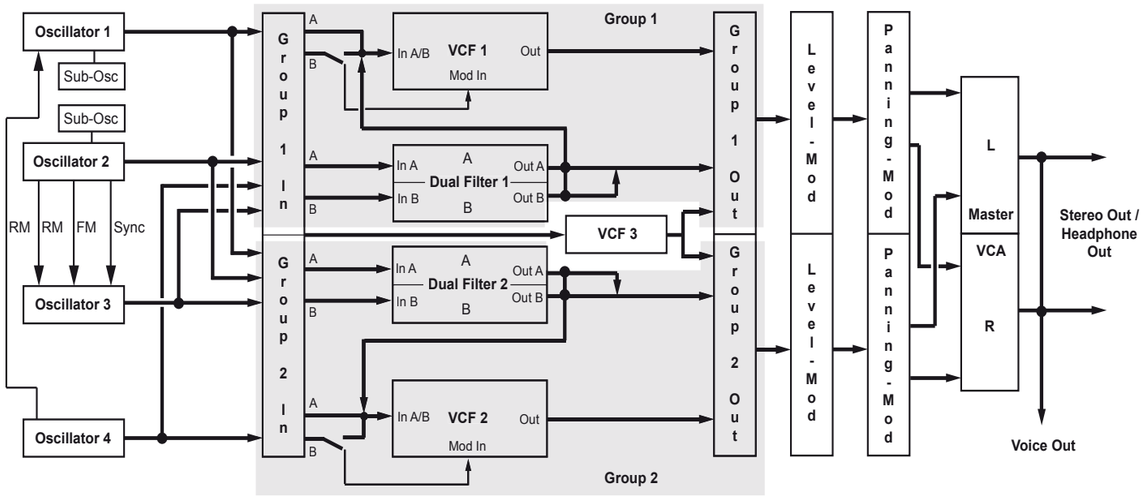
As you have already learned, Schmidt is an eight-voice polyphonic synthesizer boasting real analog signal generation. To be more accurate, the audio signal path is fully analog for the biggest part. All modulation routings are digitally controlled in order to provide outstanding results at the highest possible degree of precision. Let‘s have a peek at Schmidt‘s guts on the following page.

SIGNALPATH



Above you see a brief overview of Schmidt‘s signal path: Four OSCILLATORS (two of them with additional Sub Oscillator) send their signals into a routing matrix which is called GROUP IN. Here, each Oscillator signal is routed into the filter section which provides three parallel signal paths. Filter Section Group 1 and 2 are identical and pretty complex in themselves. They can shape two entirely different timbres out of the incoming Oscillator signals. The third filter section VCF 3 is an add-on to fatten up things a bit more. In the GROUP OUT section, the three signals are mixed down into a stereo sum which is fed into the Level and Panning Modulation section, and finally into the master VCA. This one controls the master volume before the final stereo signal is sent to the outputs. Whew!

Using our trusty old magnifying glass, we will go much deeper into detail soon. We will follow the signalpath from left to right:



Let‘s have a look at the **Oscillator section** first (left handed):

- Oscillator 1 and 2 (each with Sub Oscillators) feed their signals into Group In 1 and/or Group In 2.
- Oscillator 3 and 4 also feed their respective signals into Group In 1 and/or Group In 2.
- Oscillator 2 can modulate Oscillator 3 (frequency modulation and ring modulation) and can be hard-synced to it as well for even more timbral variety.
- Oscillator 4 is ring-modulated with Oscillator 1.

Each Oscillator is equipped with more or less complex modulation routings (essentially frequency/pitch and pulse-width) with their own dedicated modulation sources.

You will soon get an idea why, even on Oscillator level, Schmidt is capable of creating very complex timbres that go way beyond conventional analog synthesizers.

The next section of the signal path is split into two parallel **groups** that will generate two different timbres at the same time:
Each group comprises the input router (**Group In**) and two filters. The **VCF** is a more or less old-fashioned four-pole filter (24 dB) that can morph between its different filter response characteristics.
The **Dual Filter (DF)** is merely a pair of two filters that can be combined with each other to produce a variety of different response characteristics. VCF and Dual Filter each have a different character and ensure a maximum of tonal and timbral flexibility.

Group In 1 sends each Oscillator signal into the **VCF** and/or one or both inputs (A/B) of the **Dual Filter**. Apart from that, the output of the Dual Filter can be fed back into VCF 1. Input B of the VCF can be used to control the cut-off frequency. Mind-boggling? Not really. Take a minute or two to recapitulate the signal path up to this point. Group In 2 works the same way. In addition to that, all Oscillator signals can as well be routed to **VCF 3** which is a traditional low-pass filter.

The **Group Out** sums the output signals of all filter outputs into a single signal which is now modulated in terms of level and pan position. You can have two different sounds in parallel at this point. They can be panned / cross-faded by the Panning Mod section. The **Master VCA** generates a final, global volume envelope and the signals are routed to the various outputs. Please take another minute to recapitulate the second half of the signal path. It is easier than you might believe at first sight.

On the **front panel**, you will find all the sections spread out in front of you from left to right, according to the signal path. About 95% of the sound generation functions can be accessed without using the LCD and menus. That means, even though it is quite a complex beast, Schmidt is pretty intuitive to work on once you are familiar with the way its functions are organized and accessed.

III.

PROGRAMMING SOUNDS

PROGRAMMING SOUNDS

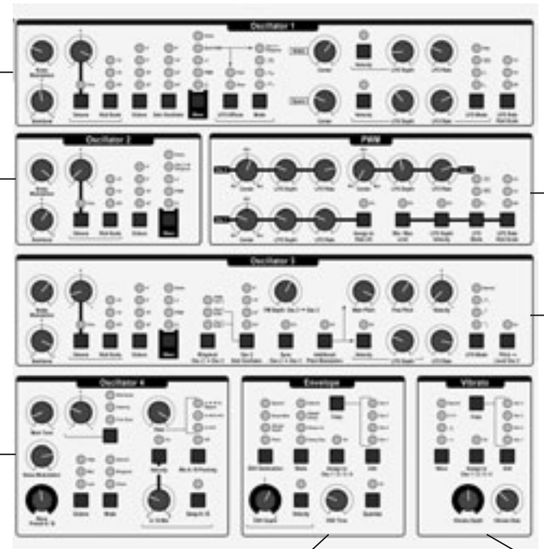
In this following chapter, we will dig even deeper and find out about the inner secrets of each section. You will learn everything about all functions and how to use them. Please read carefully and enjoy while you are at it.

OSCILLATOR SECTION

Schmidt‘s Oscillator section is definitely outstanding (we are a bit proud of that, as you may have noticed already). You will find lots and lots of routing and modulation options that yield very impressive and complex sounds even on oscillator level. The main assets of Schmidt‘s sound generation are ring and pulse-width modulation – with some pretty weird details that might be new even to you! By the way, the Oscillators are truly analog with digital control to ensure most precise tuning, tracking, and modulation.

By taking a look at the Oscillator section, you will find one thing that is common of all of Schmidt‘s modules: Each section (oscillators, filters, panning, VCA) has its own dedicated modulation source (envelopes, LFOs etc.). That is why you will not find a modulation matrix but lots of modulation sources directly placed within the sound generating / shaping modules which helps immediacy a lot in our humble opinion.

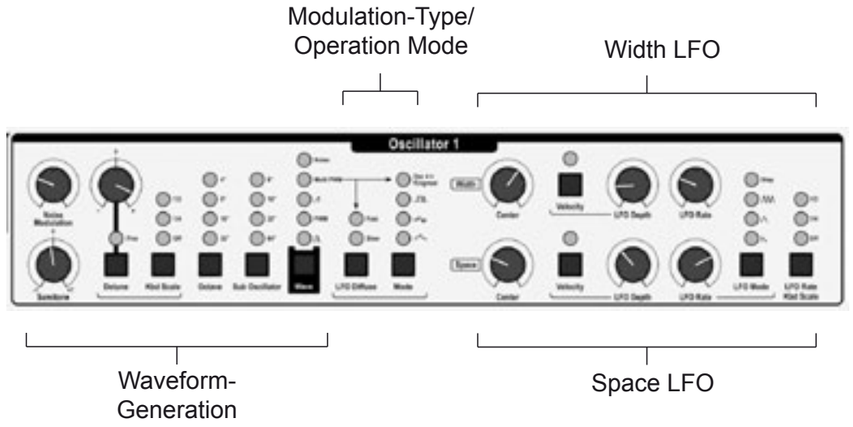
The Oscillator section features four Oscillators, each with a different scope of functions. Here you will find all modulation routings and sources relevant to the Oscillator as well.


Oscillator 1
with Sub-Oscillator and two LFOs for (Multi)-PWM
Oscillator 2
with Sub-Oszillator (located in Osc. 3)
Oscillator 4
with LFO for waveform mix
PWM
three LFOs for PWM of Osc 1, 2 and 3
Oscillator 3
with dedicated pitch-LFO
Envelope
four AD-envelopes for pitch-modulation (Osc. 1-4) resp. vibrato
Vibrato
four LFOs for pitch modulation (Osc. 1-4)

First, we will check out the functions of each oscillator separately. With the next step we will learn about interaction (modulation) between the various modules.

OSCILLATOR 1

Oscillator 1 has some pretty nifty tricks up his sleeve to produce complex timbres. We call it Multi PWM. Its function is pretty unique and rather complex, so please indulge yourself some time for careful study.



Waveform Generation and Modulation Type / Operation Mode controls:

- **Noise Modulation**: Pitch of Oscillator 1 is modulated by a noise signal. Controls modulation depth.
- **Semitone**: Detunes Oscillator 1 up or down by seven semitones.
- **Detune**: Detunes Oscillator 1 up or down by one semitone, respectively 10 cent up / down (if **Fine** key is pressed).
- **Kbd Scale**: Alters the ***Detune*** depending on the played note on the keyboard. Reference point is key A3:
  1/2: Two octaves below A3 quadruples Detune; two octaves above A3 quarters Detune.
  1/4: Two octaves below A3 doubles Detune; two octaves above A3 halves Detune.
  OFF: Detune is independent of the played note on the keyboard.

The ***Kdb Scale*** function is useful to control the beat frequency between the oscillators more precise for lower and higher note ranges.

- **Octave**: Octave setting of Oscillator 1.
- **Sub Oscillator**: Octave setting of Sub Oscillator 1 (square wave).
  No LED active: Sub Oscillator is not active.

Please note: The octave setting of the Sub Oscillator is independent of the main Oscillator, i. e. the Sub Oscillator can have a higher setting than the main Oscillator.
If main and Sub Oscillator have the same octave setting, the output signal can be almost inaudible due to phase and frequency cancellation.

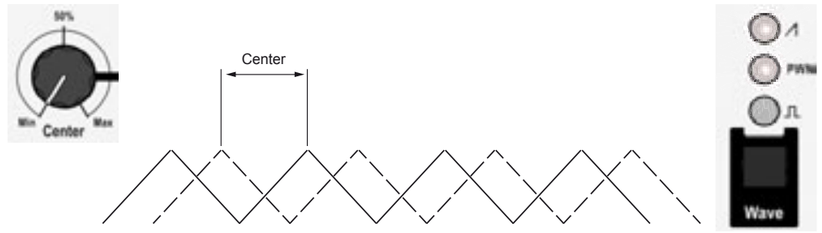
- **Wave**: Waveform / modulation type of Oscillator 1. Please refer to the following chart for all available settings:

Wave key setting	Waveform	Modulation Type	Modulation Source
R	Square	Pitch	Vibrato LFO, Noise
PWM	Pulse Pulse	Pitch Pulse Width	Vibrato LFO, Noise PWM LFO 1
S	Sawtooth	Pitch	Vibrato LFO, Noise
S + PWM (see note below)	Two phase-shifted saw-tooth waveforms	Pitch Phase Modulation	Vibrato LFO, Noise PWM LFO 1

Wave key setting	Waveform	Modulation Type	Modulation Source
MULTI PWM (see note below)	Complex Wave	Pitch Waveform-Mod (depending on **Mode** setting)	Vibrato LFO, Noise Width/Space LFOs
MULTI PWM + PWM	Complex Wave with PWM	Pitch Waveform-Mod (depending on **Mode** setting) Above + Pulse Width	Vibrato LFO, Noise Width/Space LFOs PWM LFO 1
NOISE	Slightly coloured noise	none	none

S + PWM

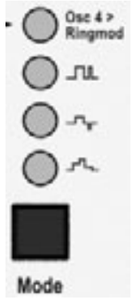
When ***S*** and ***PWM*** are enabled, the Oscillators (Osc 1 as well as 2 and 3) produce two sawtooth waves that are phase-modulated – that means, their respective peaks are shifted against each other. The shift amount is determined by the **Center** parameter which can be modulated by the PWM LFO.



Multi PWM

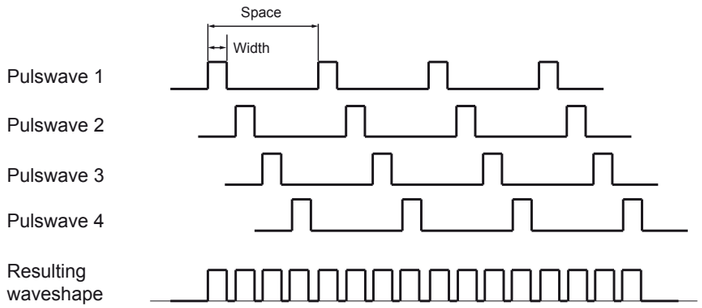
When ***MULTI PWM*** is enabled, the remaining controls of the Oscillator 1 section become active. But now it is about time to clear up what is meant by ”Multi PWM”:
In Multi PWM mode, Oscillator 1 generates four pulse-waves in parallel that are combined in various ways to produce complex waveforms. There are several parameters with which to control the shape of the resulting waveform:

- **Space / Width**: ***Space*** and ***Width*** determine the ratio between peaks and troughs of the four pulse-waves. Depending on this ratio, the resulting waveform takes on different shapes. Please refer to the upper section of the figure on page 20. These two parameters can be controlled independently by two dedicated LFOs.
- **Mode**: Beyond that, modes ***1*** to ***3*** determine the way how the four pulse-waves are combined. As a result, each mode again produces different waveshapes. Please refer to the lower section of the figure on page 20.



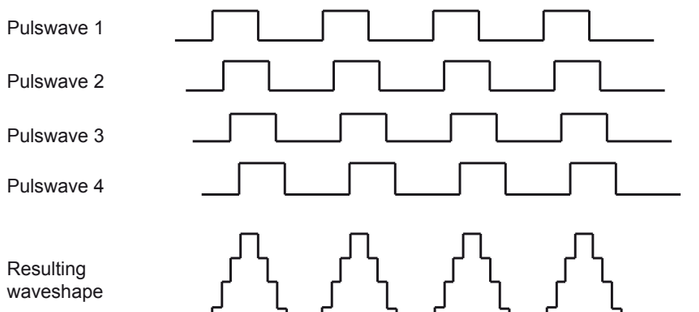
In mode ***4 (OSC 4 > RINGMOD)***, the resulting waveform that is produced by the process of mode 3 is additionally ring-modulated by Oscillator 4.

The figure on the following page shows all available modes and their operation.

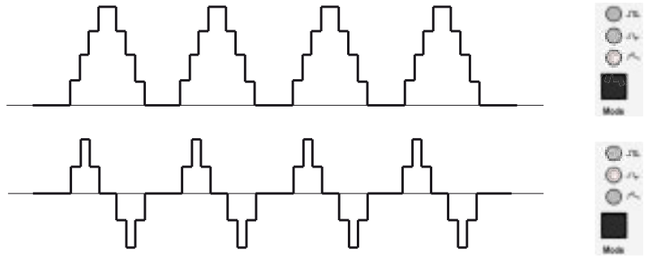


Space value significantly higher as **Width** value
=> the four source waveshapes do not overlap

No cancellations / amplification in resulting waveshape

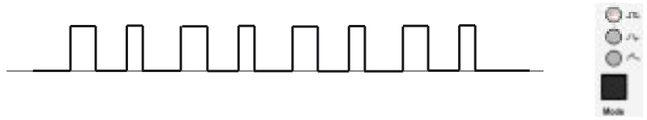


Altered ratio between **Space** value and **Width** value
=> the four source waveshapes partially overlap



Mode 1:
1 + 2 + 3 + 4

Mode 2:
1 + 2 – 3 – 4



Mode 3:
Cancellations and constant level

Mode key setting	Modulation Type	Modulation Source
MODE 1	Pitch Waveform-Modulation	Vibrato LFO, Noise PWM LFO 1
MODE 2	Pitch Waveform-Modulation	Vibrato LFO, Noise PWM LFO 1
MODE 3	Pitch Waveform-Modulation	Vibrato LFO, Noise PWM LFO 1
MODE 4	Pitch Waveform-Modulation Waveform-Mod (Ringmodulation)	Vibrato LFO, Noise PWM LFO 1 Oscillator 4

LFO Controls Oscillator 1

The remaining controls belong to the Multi PWM Space and Width LFOs:

- **LFO Depth**: Modulation depth of ***Space*** / ***Width***.
- **Velocity**: Modulation depth depends on ***keyboard velocity***.
- **LFO Rate**: Modulation rate of ***Space*** / ***Width***.
- **LFO Mode**: Modulation waveform of both LFOs
  - ***STEP***: Space LFO produces Sample & Hold function (stepped waveform) while the S&H frequency is controlled by the ***Rate*** parameter of the Width LFO (**LFO Diffuse** has to be disabled!).
  - /\/\/\ : Continuous triangular wave
  - /\ : One-shot triangular wave
  - |\ : One-shot saw wave
- **LFO Diffuse**: Each of the four pulse waves are modulated with different intensity (only Space LFO).
- **LFO Rate Kbd Scale**: Scales the modulation speed (***LFO Rate)*** of the LFO across the keyboard. Reference point is key A3:
  - ***1/2***: Two octaves above A3 – quadruples LFO rate; two octaves below A3 quarters LFO rate.
  - ***1/4***: Two octaves above A3 – doubles LFO rate; two octaves below A3 halves LFO rate.
  - ***OFF***: Space / Width LFO rate is independent of played note position on the keyboard.

One important note on modulation depths:

Not only the current control setting of a parameter, but also the values of all other modulation depth controls are added to the final value of the resulting modulation depth. Please note that modulation depth usually has negative values as well. If the resulting modulation depth value exceeds the total parameter range, certain modulators can have little or no effect on the entire modulation. For example, if you set the Space control to 3 o'clock position and add a high LFO depth value, an additional second modulator (e.g. velocity) might produce no audible effect. Please refer to page 62. It shows the summed modulation depth values for the VCF1 cut-off.

Oscillator 1 modulation paths

To make things even clearer (we are not being sarcastic, mind you!), we will cast a look under the hood of Oscillator 1 and examine all signal and modulation inputs and outputs.
Have a look at OSC1 in the figure on the next page. From right to left, you can see all the different modulation inputs and their controls:

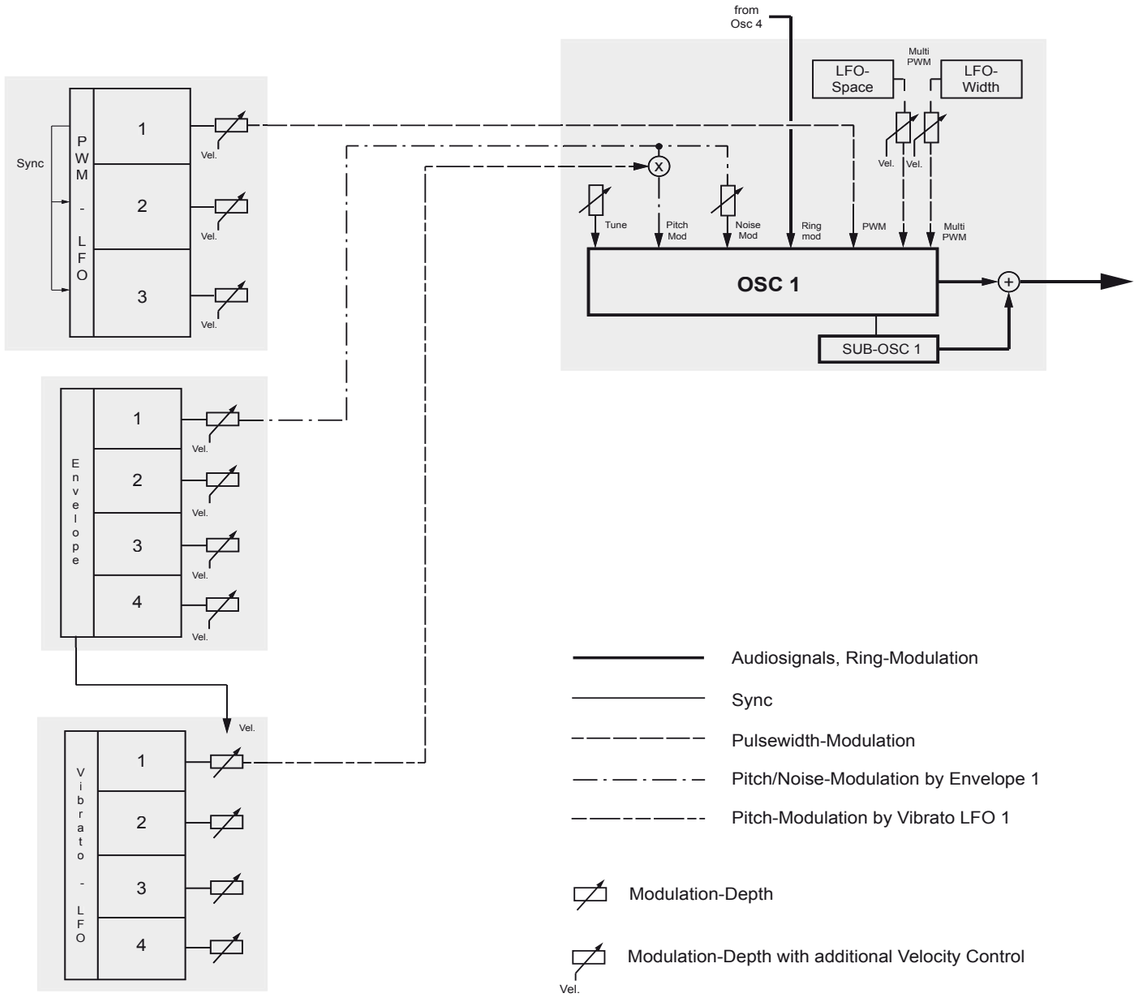
Inputs:

- Space and Width LFOs to control Multi PWM.
- The PWM input that is fed by the PWM LFO 1.
- The ring-modulation input that is fed by Oscillator 4.
- The noise modulation input with its amount control and its connection to the Oscillator envelope (more on this later).
- The pitch modulation input that is fed by the pitch envelope, the Vibrato LFO (more on this later) and the noise source.
- The Tuning and manual pitch controls.

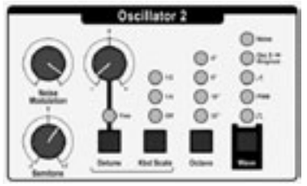
Outputs:

- The audio output with a mix of main- and sub oscillator signals.

The modulation sources in the left half of the image will be covered as soon as we managed the other oscillators.



OSCILLATOR 2



Oscillator 2 is much more basic. You will figure out pretty quickly. Oscillator 2 has a Sub Oscillator but for technical reasons, it is fully controlled from the panel section of Oscillator 3.

- **Noise Modulation**: Pitch of Oscillator 2 is modulated by a noise signal.
- **Semitone**: Detunes Oscillator 2 up or down by seven semitones.
- **Detune**: Detunes Oscillator 2 up or down by one semitone respectively 10 cent up / down (**Fine** key pressed).
- **Kbd Scale**: Alters the ***Detune*** depending on the played note on the keyboard. Reference point is key A3:
  1/2: Two octaves below A3 quadruples Detune; two octaves above A3 quarters Detune.
  1/4: Two octaves below A3 doubles Detune; two octaves above A3 halves Detune.
  OFF: Detune is independent of the played note on the keyboard.

The ***Kdb Scale*** function is useful to control the beat frequency of the oscillators more precise for lower and higher note ranges.

- **Octave**: Octave setting of Oscillator 2.
- **Wave**: Waveform / modulation type of Oscillator 2.

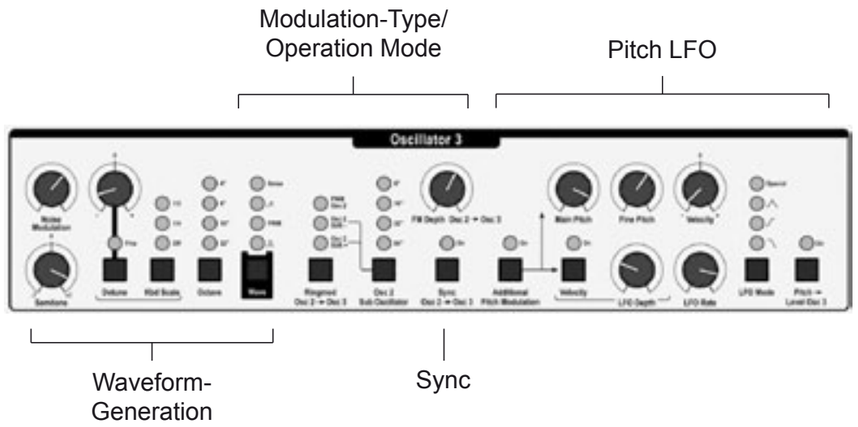
Wave key setting	Waveform	Modulation Type	Modulation Source
R	Square	Pitch	Vibrato LFO, Noise
PWM	Pulse Pulse	Pitch Pulse Width	Vibrato LFO, Noise PWM LFO 2
S	Sawtooth	Pitch	Vibrato LFO, Noise
S + PWM	Two phase-shifted sawtooth waves	Pitch Phase Modulation	Vibrato LFO, Noise PWM LFO 2
Osc 3 => Ringmod	Complex Wave Complex Wave	Pitch Ring Modulation	Vibrato LFO, Noise Oscillator 3
Noise	Slightly coloured noise	none	none

The phase modulation mode (S + PWM) is described in the Oscillator 1 section above.

The signal and modulation inputs of Oscillator 2 are closely related to Oscillator 3. That is why we will examine them when dealing with Oscillator 3.

OSCILLATOR 3

Oscillator 3 is somewhat special again. It has outstanding ring-modulation power and it is closely related to Oscillator 2. Take some time to explore it carefully.



- **Noise Modulation**: Pitch of Oscillator 3 is modulated by a noise signal.
- **Semitone**: Detunes Oscillator 3 up or down by seven semitones.
- **Detune**: Detunes Oscillator 3 up or down by one semitone resp. 10 cent up / down (**Fine** key pressed).
- **Kbd Scale**: Alters ***Detune*** independent of the note played on the keyboard. Reference point is key A3:
  1/2: Two octaves below A3 quadruples Detune; two octaves above A3 quarters Detune.
  1/4: Two octaves below A3 doubles Detune; two octaves above A3 halves Detune.
  OFF: Detune is independent of the played note on the keyboard.
- **Octave**: Octave setting of Oscillator 3.
- **FM Depth**: Intensity of frequency modulation by Oscillator 2 (exponential FM).
- **Wave**: Waveform / modulation type of Oscillator 3.

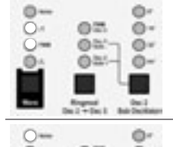
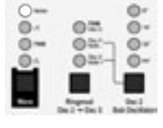
The following chart shows which waveforms are available within the available types of modulation. Please note that most of the different modulation types (pitch, FM, ringmod, PWM) are available at the same time.

Wave key setting	Resulting Waveform	Modulation Type	Available Modulation Source
R	Square Complex Wave Complex Wave	Pitch FM Ringmod	Vibrato LFO 3, Noise, Pitch LFO Oscillator 2 Sub Oscillator 2
PWM	Pulse Pulse Complex Wave Complex Wave Complex Wave	Pitch Pulse Width FM Ringmod Ringmod + Pulse Width	Vibrato LFO 3, Noise, Pitch LFO PWM LFO 3 Oscillator 2 Sub Oscillator 2 Sub Oscillator 2, PWM LFO 3
S	Sawtooth Complex Wave Saw/Pulse Mix Complex Wave	Pitch FM Amplitude Modulation Ampl-Mod + Ringmod	Vibrato LFO 3, Noise, Pitch LFO Oscilliator 2 PWM LFO 3 PWM LFO 3, Sub Osc 2 (Phase +/–)
S + PWM	2 phase-shifted saw-waves Complex Wave	Pitch Phase Modulation FM	Vibrato LFO 3, Noise, Pitch LFO PWM LFO 3 Oscillator 2
Noise	Slightly coloured noise	none	none

Modulation Type / Operation Mode controls

- **Ringmod Osc2 => Osc3**: Selects the ring-modulation source (Osc 2 or Sub Osc 2) and enables / disables Sub Oscillator 2, depending on the setting of the ”**Wave**“ key.
- **Osc2 SubOsc**: Selects the octave range of the Sub Oscillator of Oscillator 2 or the octave range of the ringmod source respectively. No **LED** means Sub Oscillator is ”***OFF***“.

The following figure shows the interaction of the three function keys **Wave**, **Ringmod Osc2 –> Osc3** and **Osc2 SubOsc**.
The phase modulation mode (***S + PWM***) is described above in the Oscillator 1 section.

Button Setting	**Result**	
	Output Oscillator 3 / Modulation type	**Output Sub Oscillator 2**
	Square Wave No modulation	disabled
	**Ringmodulation** Sub Osc 2 modulates Osc 3 (Square)	Square Wave 32“ - 4“
	**Modulated Pulse Wave** Osc 3 gets PWM from PWM LFO 3	disabled
	PWM / Ringmodulation Sub Osc 2 modulates Osc 3 (with PWM)	Square Wave 32“ - 4“
	PWM / Ringmodulation Osc 2 (with PWM) modulates Osc 3 (with PWM)	disabled
	Saw Wave No modulation	disabled
	Saw Wave mixed with slightly amplitude-modulated Square Wave Modulation controlled by PWM LFO 3	disabled
	As above with additional Ringmodulation by Sub Osc 2 Ampl. Modulation controlled by PWM LFO 3 Ringmod controlled by Osc 2	Square Wave 32“ - 4“
	Phase-modulated pair of Saw Waves Modulation controlled by PWM LFO 3	disabled
	Noise Signal No modulation	disabled

- **Sync**: Synchronizes Oscillator 3 to Oscillator 2. Sounds particularly interesting when ring-modulation is enabled as well.

- **Additional Pitch Modulation**: Enables additional fiunctions to control the pitch of Oscillator 3 independently of the Vibrato LFO. You will find here another LFO as well as controls for coarse/fine pitch and velocity amount.

- **Main Pitch**: Shifts the pitch of Oscillator 3 up or down by approximately two octaves or sets the range of the Pitch LFO respectively.

- **Fine Pitch**: Fine adjustment of Main Pitch.

- **Velocity** (control): When turned up, keyboard velocity directly controls the pitch of Oscillator 3 with positive or negative amount. The entire Additional Pitch Modulation section is great for expressive ring-modulation and sync sounds.

- **LFO Depth**: Modulation Depth

- **Velocity** (key): LFO Depth is controlled by keyboard velocity.

- **LFO Rate**: Modulation speed

- **LFO Mode**:
  / : Continuous triangular waveform
  /I : One-shot rising slope
  I : One-shot falling slope
  SPECIAL: Space for future updates

- **Pitch => Level Osc 3**: Modulates the output level of Oscillator 3 according to the Pitch LFO settings.

Oscillator 2/3 modulation paths

The figure on the next page shows the entire signal routing with inputs and outputs of Oscillators 2 and 3.

Oscillator 2 is quite simple – there are just three modulation inputs and one modulation output:

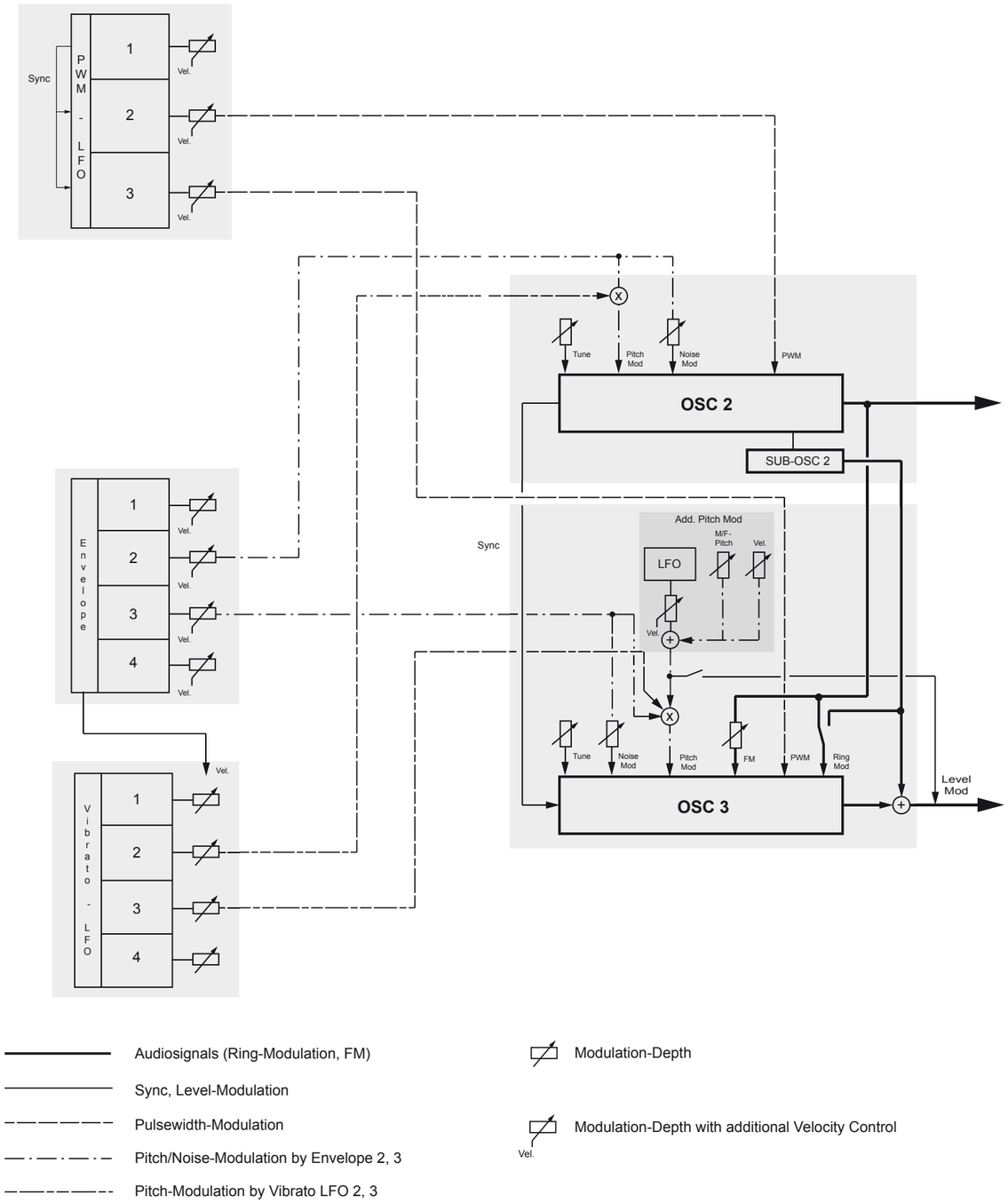
Inputs:
- The PWM input fed by PWM-LFO 2.
- The pitch modulation input fed by the pitch envelope, the Vibrato LFO and the noise source.
- The controls for Tuning and manual pitch control.

Outputs:
- Oscillator 2 sends a sync signal to Oscillator 3.

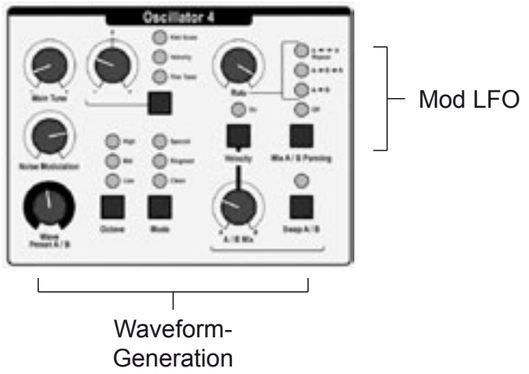
Oscillator 3 is a bit more mind-boggling. Let‘s check out all its modulation inputs:

- The ring-modulation input fed by Oscillator 2 or Sub Oscillator 2.
- The PWM input fed by PWM LFO 3.
- The FM input fed by Oscillator 2.
- The pitch modulation input that is fed by the pitch envelope, the Vibrato LFO, the noise source, and the „Additional Pitch Modulation“ with controls and LFO.
- The controls for Tuning and manual pitch control.
- The sync input fed by Oscillator 2.

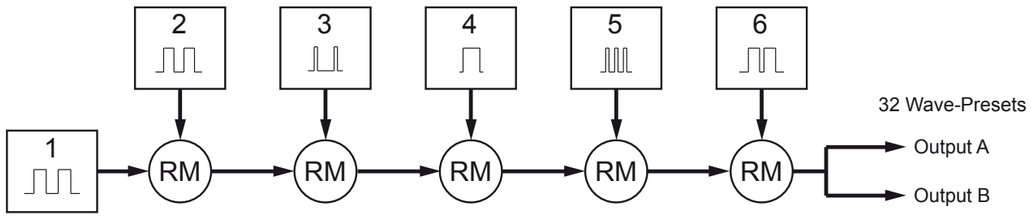
The „Additional Pitch Modulation“ section can also control the output level of Oscillator 3.



OSCILLATOR 4

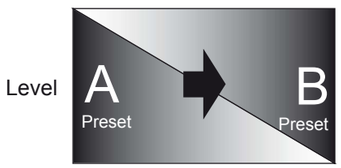


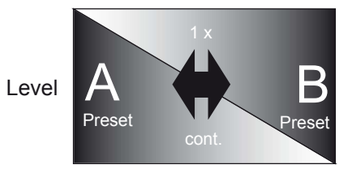
Yes, there actually is a fourth Oscillator! It is also quite special but a lot less complex than Oscillator 3. It is entirely based on ring-modulation and produces complex wave-forms.
Oscillator 4 features a chain of five ring modulators that are fed by six pulse-waves with different pulse-widths each. The product of Ringmod 1 is ring-modulated by the third pulse-wave and so on. Depending on the internal parameter settings, two groups of 32 wave presets each are generated.



Waveform Generation and Mod LFO controls

- **Noise Modulation**: Pitch of Oscillator 4 is modulated by a noise signal.
- **Main Tune**: Detunes Oscillator 4 up or down by one octave.
- **Fine Tune**: The control handles three functions depending on the key setting:
  FINE TUNE: Detunes Oscillator 4 up or down by about one semitone
  VELOCITY: Routes keyboard velocity to pitch with positive or negative amount.
  KBD SCALE: Determines keyboard / pitch scaling. In center position, each key produces the same pitch.
- **Octave**: Octave setting of Oscillator 4.
- **Mode**: Sets the ring-modulation algorithm:
  CLEAN: Produces harmonically related waveforms, resulting in a clean sound.
  RINGMOD: No harmonically related waveforms, resulting in a more noisy, dissonant or chiming sound.
- **A / B Mix**: Crossfades between two wave presets.
- **Swap A / B**: Switches both wave presets: A becomes B and B becomes A.





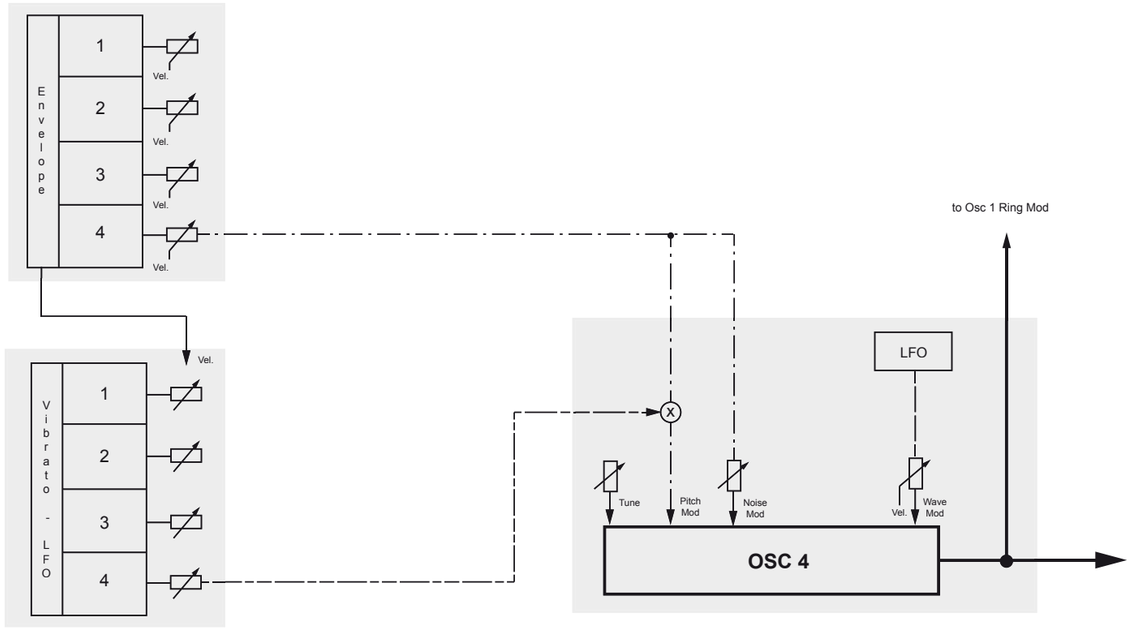
- **Velocity**: Puts wave preset morphing under velocity control.
- **Mix A / B Panning**: Enables a dedicated LFO to crossfade between the wave presets automatically.
  OFF: LFO disabled.
  A => B: Crossfades between presets A and B.
  A => B => A: Crossfades between presets A to B and back to A.
  A <=> A
  REPEAT: Continuous crossfade between A and B.
- **Rate**: LFO frequency

Oscillator 4 modulation paths

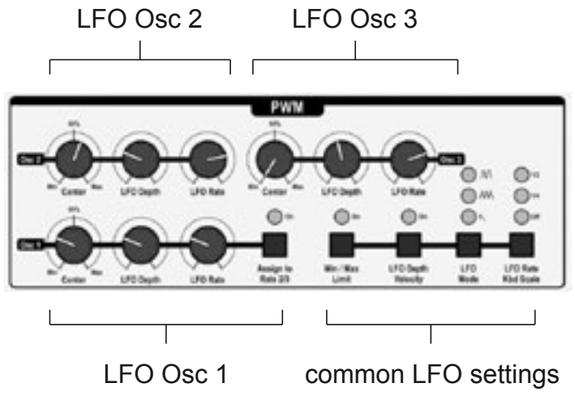
The following figure shows the entire signal routing with inputs and outputs of Oscillator 4.

Inputs:
- The wave crossfade / mod input fed by the internal LFO.
- The pitch modulation input that is fed by the pitch envelope, the Vibrato LFO, and the noise source.
- The Tuning controls for manual pitch control.

Outputs:
- The audio output is split and used as ring modulation source for Oscillator 1.



PWM LFOS



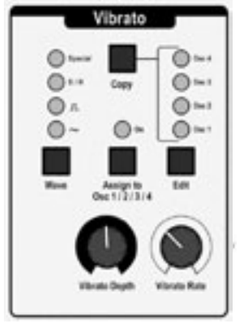
These three LFOs are used to control pulse-width modulation (PWM) of Oscillators 1, 2, and 3. They are all designed identically. The parameters controlled by a knob can be adjusted individually, the key functions are the same for all three LFOs.

- **Center**: Pulse-width of pulse waveform or phase shift amount of saw waves respectively (please refer to description of Oscillator 1 on page 19).
- **LFO Depth**: Modulation depth.
- **LFO Rate**: Modulation frequency.
- **Assign to Rate 2/3**: Assigns rate setting of LFO 1 to LFOs 2 and 3.
- **Min/Max Limit**: Limits LFO modulation depth in order to prevent signal cancellation when pulse-width goes beyond a certain level.
- **LFO Depth Velocity**: Adds keyboard velocity to LFO Depth value.
- **LFO Mode**: Modulation waveform:
  ∿ : Continuous sine wave
  /\/\ : Continuous triangular wave
  I\ : One shot sawtooth wave
- **LFO Rate Kbd Scale**: Scales the modulation speed (***LFO Rate***) of the PWM LFO across the keyboard. Reference point is key A3:
  1/2: Two octaves above A3 quadruples LFO rate; two octaves below A3 quarters the LFO rate.
  1/4: Two octaves above A3 doubles LFO rate; two octaves below A3 halves LFO rate.
  OFF: PWM LFO rate is independent of played note position on the keyboard.

VIBRATO LFOS AND ENVELOPES IN THE OSCILLATOR SECTION

The Oscillator section features some more modulation sources to generate dynamic pitch modulation. For this purpose you will find a set of four LFOs (one for each Oscillator) and another set of four envelope generators (again one for each Oscillator). That is truly generous.

Vibrato LFOs



These four identical LFOs govern the pitch of the four Oscillators. Each Oscillator can be controlled by its dedicated LFO. The LFOs can be programmed individually or globally. All four LFOs share the same set of controls.

- **Wave**: Vibrato LFO waveform
  ∿ : Sine wave
  ⊓ : Square wave
  S/H: Stepped random wave
  ∿+S/H: Smooth random wave (both LEDs ***ON***)
  Special: Space for future updates
- **Vibrato Depth**: Modulation depth.
- **Vibrato Rate**: Modulation frequency.
- **Edit**: Selects LFO to be edited.
- **Copy**: Copies settings from one LFO to another:
  1 - Select e.g. ***LFO 1*** using the **Edit** key.
  2 - Adjust settings for LFO 1.
  3 - Hit **Copy** key. ***OSC 2***, ***OSC 3*** and ***OSC 4*** LEDs will start flashing.
  4 - Hit **Edit** again to select LFO that is to have the settings of LFO 1. Its LED keeps flashing.
  5 - Hit **Copy** again to perform copy procedure.
  6 - Repeat 3 - 5 to copy LFO 1 settings to other LFOs.

Assign to Osc. 1/2/3/4: If set to "***ON***", this function temporarily applies settings of the selected LFO to all other LFOs.

Settings return to programmed values as soon as **Assign** is disabled. This way it is easy to e.g. temporarily alter the rate of all four LFOs globally at the same time and return to their programmed individual settings by just hitting the **Assign** key once.

*Please note: when using the **Copy** function or selecting an envelope, **Assign to Osc. 1/2/3/4** has to be disabled!*

Envelopes

These four identical envelope generators directly govern the respective pitch of the Oscillators. Also, they provide dynamic control over assigned parameters like Vibrato Depth and Noise Modulation intensity. A simple example of application would be vibrato fading in and out. Each Oscillator can be controlled by its dedicated envelope. The envelopes can be programmed individually or globally. All four envelopes share the same set of controls.

- **ENV Destination**: Selects the destination parameter:
  PITCH: Oscillator pitch
  VIBRATO DEPTH: Modulation depth of the corresponding Vibrato LFO (e.g. ENV 1 controls Vibrato LFO 1).
  NOISE MOD: Modulation depth of Noise Modulation.
  SPECIAL: Space for future updates

- **Mode**: Determines the shape of the envelope:
  DECAY EXP: Exponential response
  DECAY LIN: Linear response
  ATTACK/ DECAY: Rising and falling envelope
  SPECIAL: Space for future updates

- **ENV Depth**: Determines modulation depth:
  - No pitch / vibrato / noise modulation in center position.
  - When turned clockwise, the pitch rises or the vibrato / noise modulation intensity fades in respectively.
  - When turned counter-clockwise, the pitch lowers or the vibrato / noise modulation intensity fades out respectively.

- **Velocity**: Includes keyboard velocity into ***ENV Depth*** values.

- **ENV Time**: Controls the duration of the envelope cycle or shortens and/or extends modulation fade in/out respectively.

- **Quantize**: Provides a stepped progression of pitch rise / fall. Only active when ***ENV Destination*** „***PITCH***“ is enabled.

- **Edit**: Selects envelope to be edited.

- **Copy**: Copies settings from one envelope to another:
  1 - Select e.g. envelope 1 by hitting **Edit** key.
  2 - Adjust settings for envelope 1.
  3 - Hit **Copy** key. ***OSC 2***, ***OSC 3*** and ***OSC 4*** LEDs will start flashing.
  4 - Hit **Edit** again to select envelope that is to have the settings of envelope 1. Its LED keeps flashing.
  5 - Hit **Copy** again to perform copy procedure.
  6 - Repeat 3 - 5 to copy envelope 1 settings to other envelopes.

- **Assign to Osc 1/2/3/4**: If set to ”***ON***”, this function temporarily applies settings of a selected envelope to all other envelopes (has to be disabled when using the ***Copy*** function / selecting envelopes!).

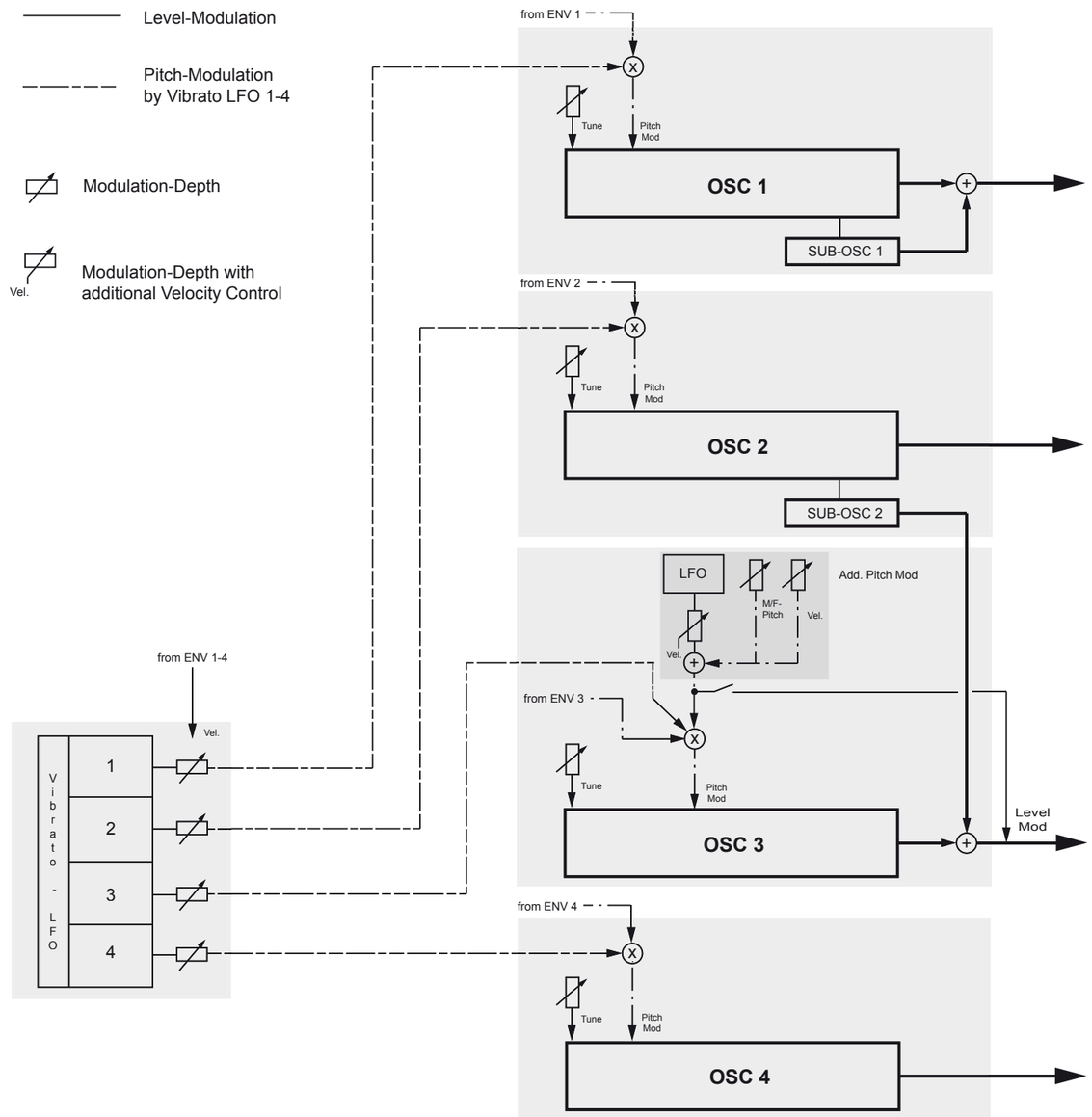
Settings return to programmed values as soon as Assign is disabled. This way it is easy to e.g. temporarily sweep the respective pitch of all three Oscillators globally and return to their programmed individual settings by just hitting the **Assign** key once.

OSCILLATOR MODULATION AND INTERACTION

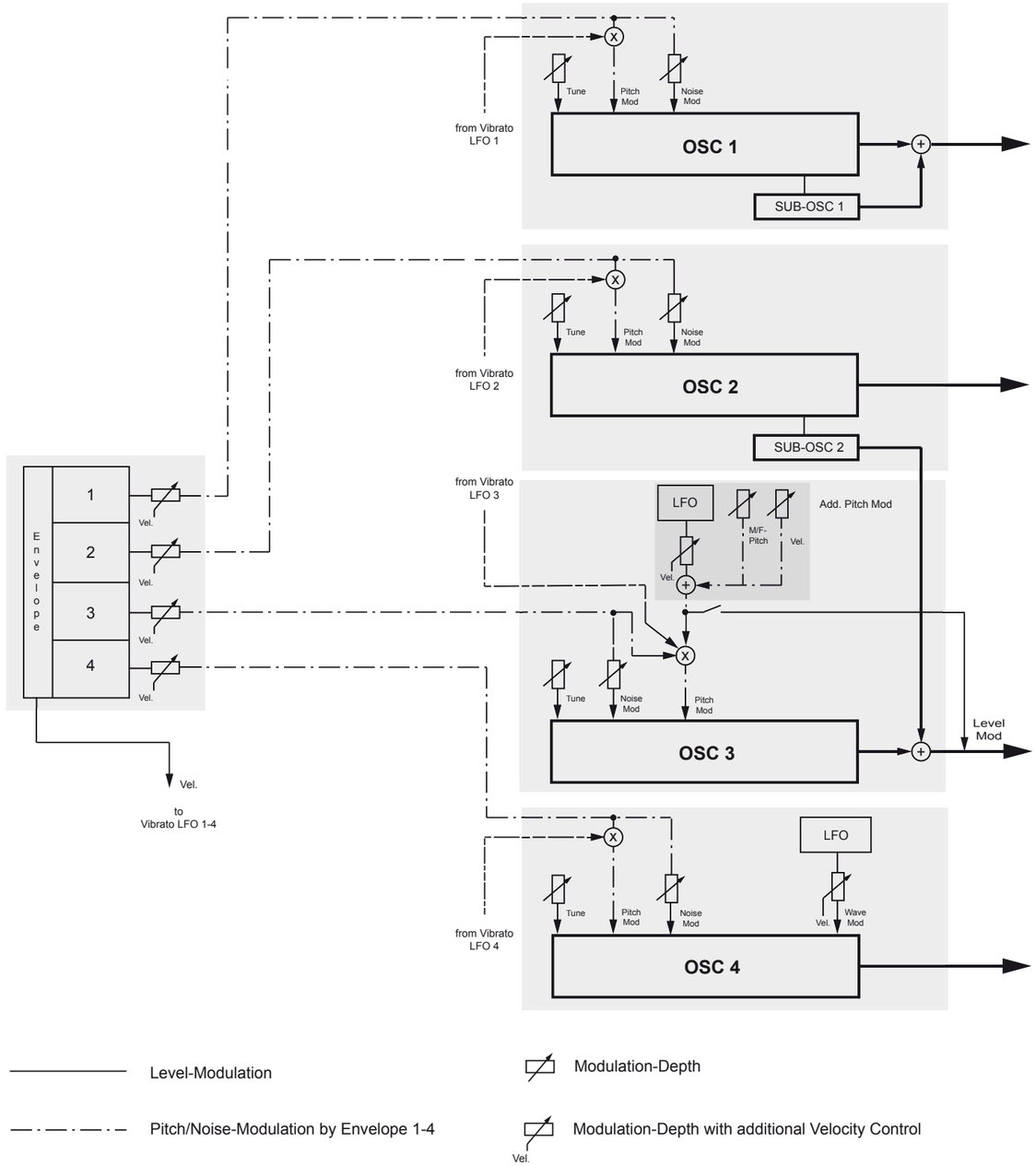
Congratulations, you have just managed all the controls of Schmidt‘s mightily powerful Oscillator section. In order to recap and deepen your knowledge, we will now have a look at the entire Oscillator section and find out about how all the different modulation paths are connected to the four Oscillators and their modifiers. You can use the following illustrations in combination with your recently gained knowledge of the Oscillator functions.

Pitch Modulation

The following figure shows the pitch modulation paths of all four Oscillators except the Oscillator envelopes.

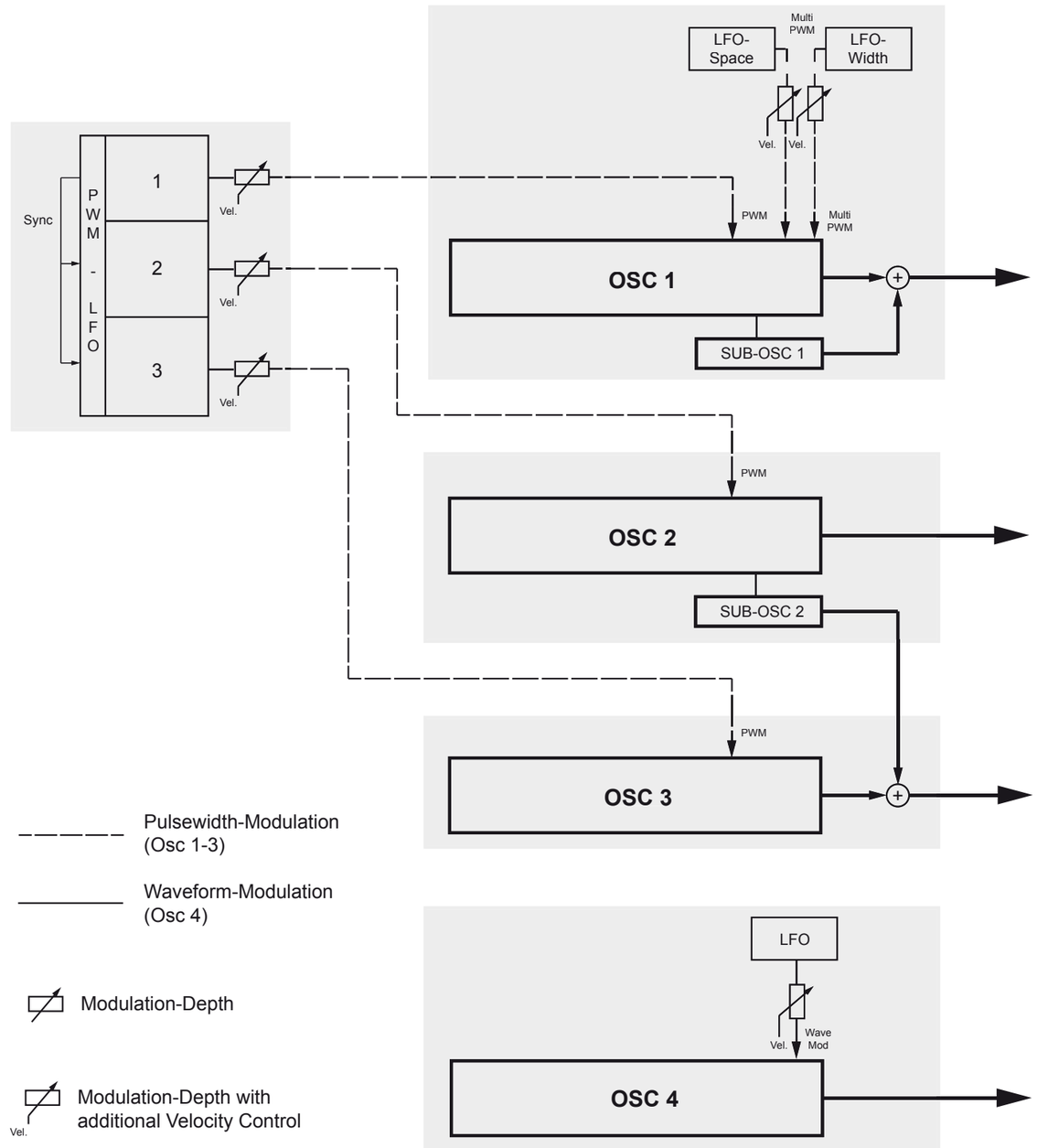


Here you will see the pitch modulation paths of all four Oscillators with envelopes but without the Vibrato LFOs.



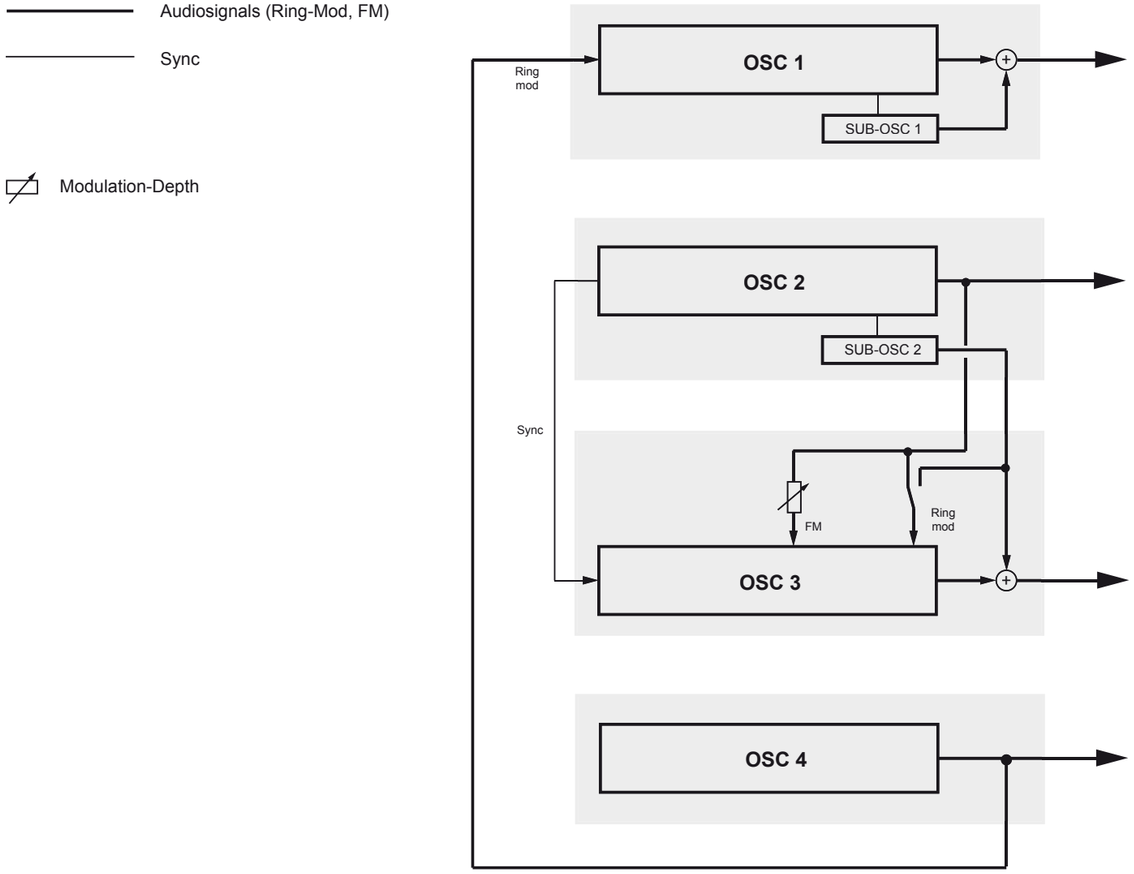
Pulse Width Modulation

This figure shows the interaction between the Oscillators and their PWM modifiers or the waveform modulation LFO of Oscillator 4 respectively.



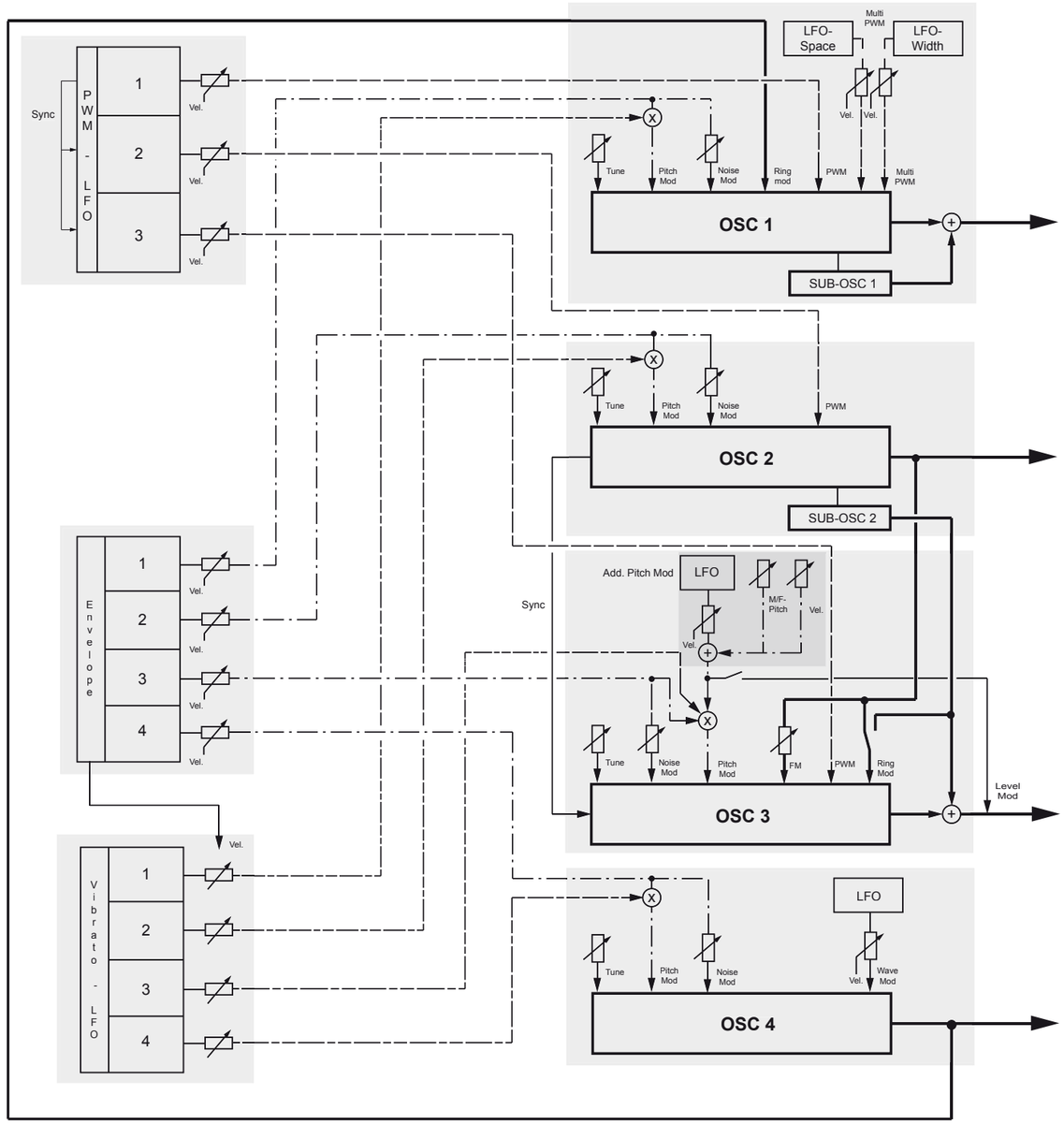
Ringmodulation, FM and Sync

Here you will see the signal routing of the audio modulation paths (FM and ring-modulation) as well as the sync connection.



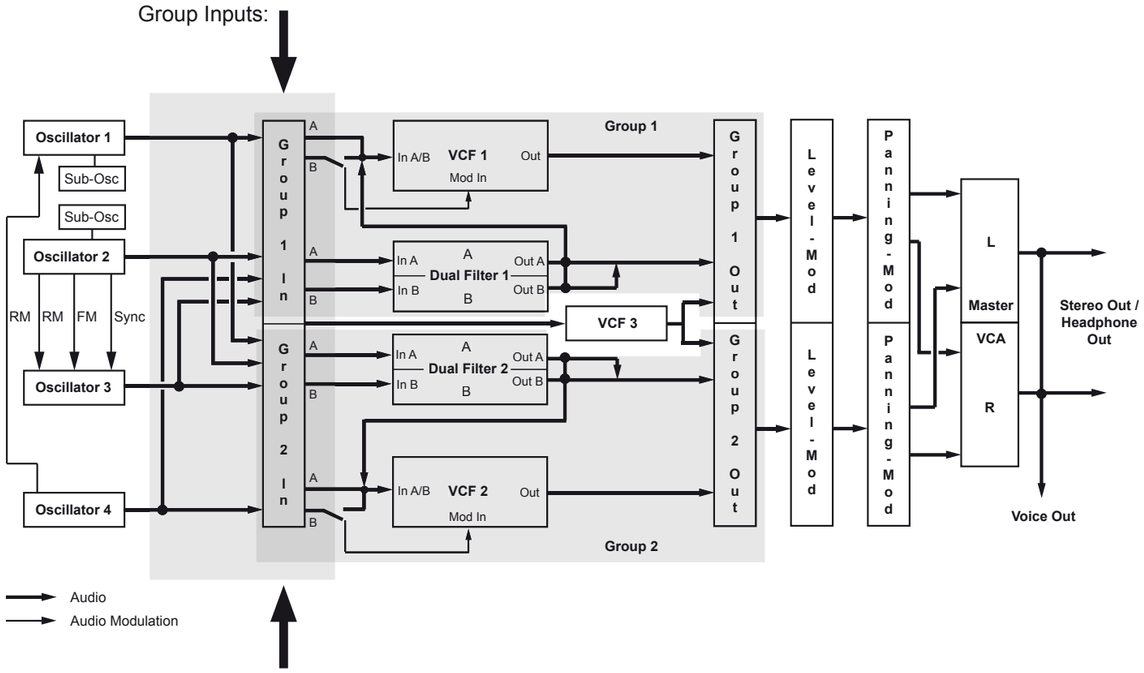
Complete Oscillator modulation routing

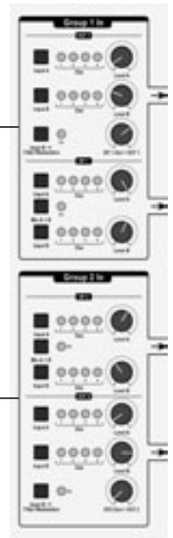
Finally, you can have a look at the complete Oscillator modulation routing. Please note that all these modulations can be used all at once if so desired. You have got the entire scope at your fingertips, from the purest and most beautiful timbres to absolute sonic mayhem – please feel free to experiment.



GROUP INPUT MODULES

When recalling the function overview on page 11, you might remember that, beyond the Oscillator section, Schmidt's signal path is divided into two parallel and almost identical sections. Each of these sections, called Groups, sports a filter array to shape the Oscillator timbres with. Splitting up the signal path into two parallel groups allows for the creation of two very different timbres out of the Oscillator signals at the same time. Apart from the filters, which we will explore soon, both groups contain input and output routing modules that allocate the different Oscillator signals to the available filter inputs, and later combine the filter outputs into one stereo signal.
Following the signal path, we will have a closer look at the Group Input modules first.





Group 1 In
signal source selection and mixer for filter inputs Group 1

Group 2 In
signal source selection and mixer for filter inputs Group 2

Each Group has two parallel filters (VCF and Dual Filter / DF) and each of these filters has two inputs (A and B). All four Oscillator outputs can be routed to each of these inputs by using the controls of the Group Inputs.

GROUP 1 IN

Group 1 In feeds both filters of group 1 with all available Oscillator signals. You will find the following controls:

VCF 1

- **Input A**: Selects one Oscillator output and routes it to input A of VCF 1.
- **Level A**: Adjusts the level of the signal fed into input A of VCF 1.
- **Input B**: Selects one Oscillator output and routes it to input B of VCF 1.
- **Level B**: Adjusts the level of the signal fed into input B of VCF 1.
- **Input B => Filter Modulation**: Feeds the signal of Input B into the cut-off modulation input of VCF 1 instead of Input B to produce filter frequency modulation.
- **DF1 Out => VCF1**: Adjusts the signal amount that is fed into the input of VCF 1 by Dual Filter 1 output. The standard parallel configuration of VCF 1 and DF 1 is now gradually morphed into a serial configuration.
  Please note that the parallel outputs are still available together with the serial routing.

DF 1

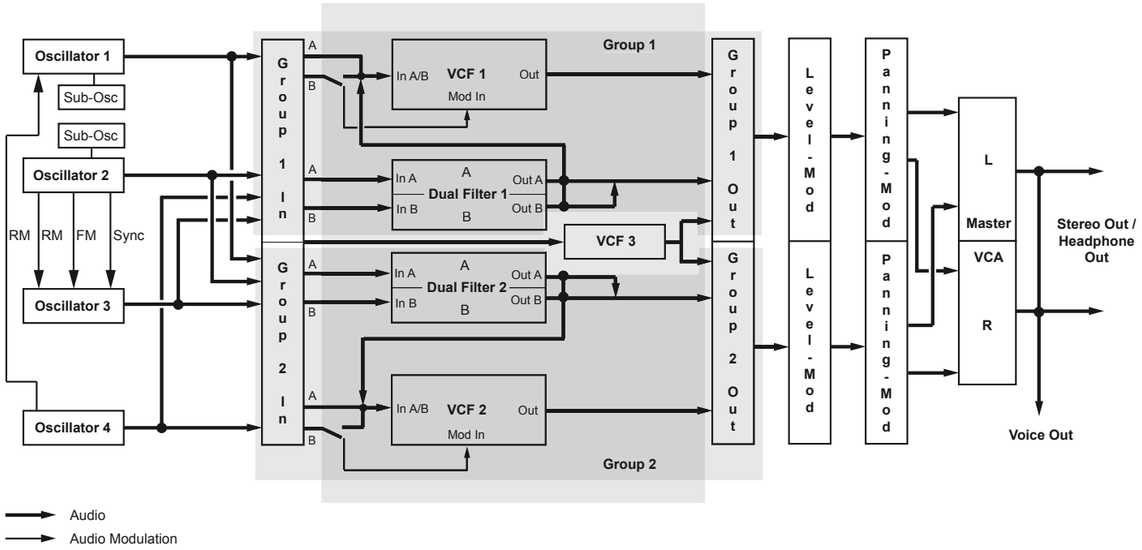
- **Input A**: Selects one Oscillator output and routes it to input A of Dual Filter 1.
- **Level A**: Adjusts the level of the signal fed into input A of Dual Filter 1.
- **Input B**: Selects one Oscillator output and routes it into input B of Dual Filter 1.
- **Level B**: Adjusts the level of the signal fed into input B of Dual Filter 1.
- **Mix A+B**: Mixes inputs A and B.

GROUP 2 IN

Group 2 In feeds both filters of group 2 with all available Oscillator signals. Group 2 is structured exactly like Group 1.

FILTER SECTION

As has previously been mentioned, the filter section is divided into two nearly identical groups to provide two different sonic treatments of the Oscillator signals in parallel. In addition to this, a third signal path can be found which feeds a very simple filter. After the filter section, the signals are combined in a stereo sum.



Since both groups and their respective filter sets are structured in an almost identical fashion, we will focus on just one group in detail and discuss the little differences later.

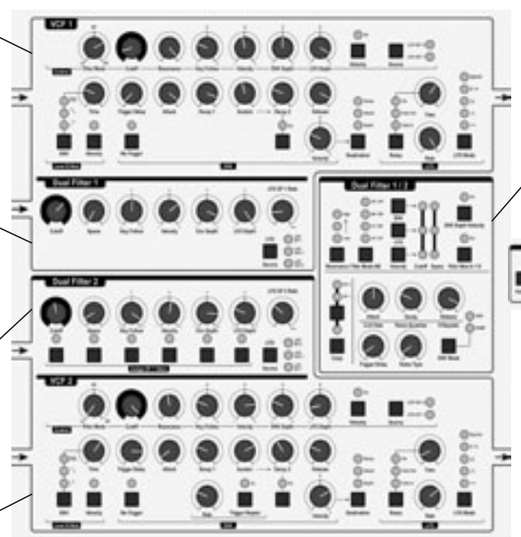
The following figure shows the controls of the entire filter section. As with the Oscillator section, the filter section also contains all the necessary modulation sources (envelopes and LFOs).

VCF 1
Moog style filter Group 1 with envelope and LFO for cutoff modulation and LFO for level modulation Input B Group 1

Dual Filter 1
Dual-Multimode Filter Group 1

Dual Filter 2
Dual-Multimode Filter Group 2

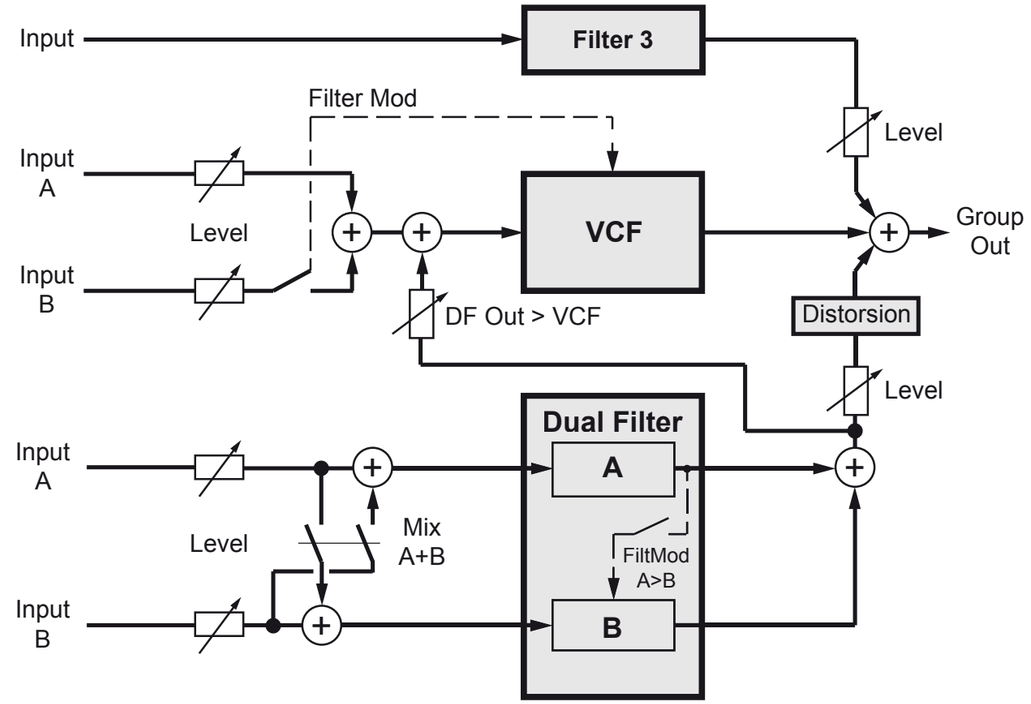
VCF 2
Moog style filter Group 2 with envelope and LFO for cutoff modulation and LFO for level modulation Input B Group 2



Dual Filter 1/2
Modulation of Dual Filter 1 and 2 (LFO, Ramp-Gen.)

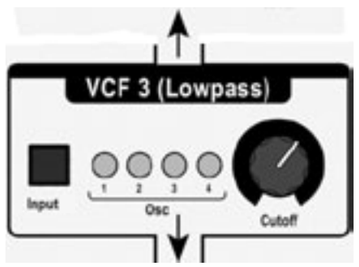
VCF 3
12 dB Lowpass filter

Lets use our magnifying glass again. The following figure shows the entire signal path of one group plus filter 3 in a more detailed way:



On the left-hand side you see the Group In module with the level controls and routing keys. Centrally, you will find the three filters (one group plus filter 3). On the right-hand side you will see the Group Out Mix module that combines the filter outputs.

FILTER 3

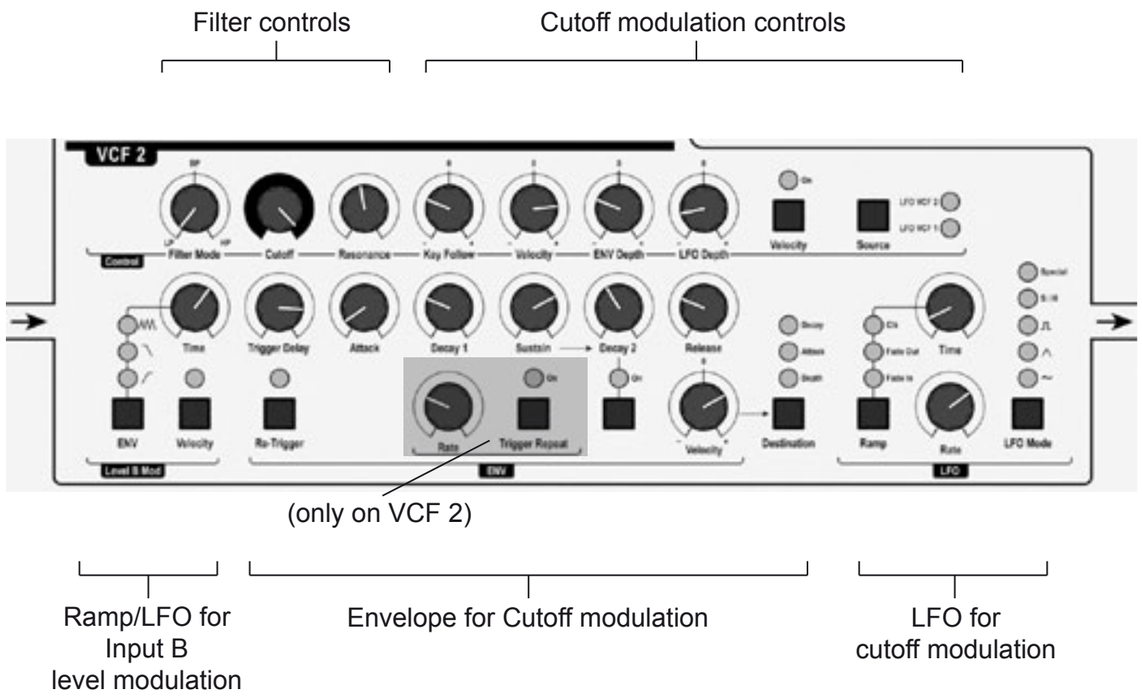


Let‘s start with Filter 3. Its a very simple 12 dB (two-pole) low-pass filter. The cut-off frequency can be adjusted but not modulated (no envelops or LFOs). It does a good job when fattening up signals even a bit more. It also adds some girth to harsh and gritty timbres if so desired.

- **Input**: Selects one Oscillator output and routes it to the input of VCF 3.
- **Cutoff**: Cut-off frequency of VCF 3 (no modulation).

VCF 1 / 2

Each VCF uses two inputs (A and B) that are combined. The VCFs are 24 dB (four-pole) filters with resonance and continuously variable response characteristics. In low-pass mode, they equal the classic Moog filter. Response characteristics, cut-off frequency and resonance can be adjusted, cut-off frequency can be modulated by keyboard position (Key Follow), keyboard velocity, envelope, and LFO. Input B can be used as cut-off modulation source as well. Each VCF sports an envelope generator and an LFO. LFOs can be combined and synced to each other. An additional modulation source controls the level of input B (Level B Mod).



Filter Controls:

- **Filter Mode**: Shifts the filter response characteristics continuously from low-pass to band-pass to high-pass.
- **Cutoff**: Cut-off frequency.
- **Resonance**: Resonance intensity.

Cut-off modulation controls:

All values are added to the resulting modulation depth. Please refer also to section „Real Time Controllers“ on page 62.

- **Key Follow**: Adds the key position to cut-off modulation amount. Negative values invert the effect.
- **Velocity** (control): Adds keyboard velocity to cut-off modulation amount. Negative values invert the effect.
- **ENV Depth**: Adds the envelope to cut-off modulation amount. Negative values invert the polarity of the envelope.
- **LFO Depth**: Adds LFO modulation to cut-off modulation amount. Negative values invert the effect of the LFO curve.
- **Velocity** (key): When enabled, keyboard velocity affects the LFO modulation depth.

- **Source**: Selects the LFO(s) from VCF 1 and/or VCF 2 as VCF frequency modulation sources. If both LFOs are selected, their modulation signals are combined. Use different rates and waveshapes to produce more complex cut-off modulation.

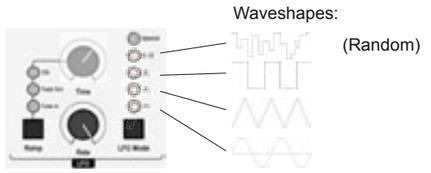
LFO controls:

The LFOs modulate the VCF cut-off frequency periodically. They sport several operation modes:

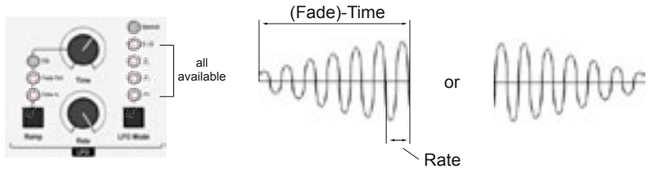
- In ***Standard LFO Mode*** (”**Ramp**” ***OFF***), ”**Rate**” controls the LFO frequency and ”**LFO Mode**” determines the modulation shape.
- In ***Fade Mode***, the LFO generates a fade in/out modulation. The fade time is adjusted using the ”**Time**” control.
- In ***Clock Mode***, more complex and random modulation waveshapes are produced. The settings of ”**Time**”, ”**Rate**” and ”**Mode**” determine the resulting modulation waveshape.

The following figure shows the different possible settings and their resulting waveshapes:

Standard LFO Mode:

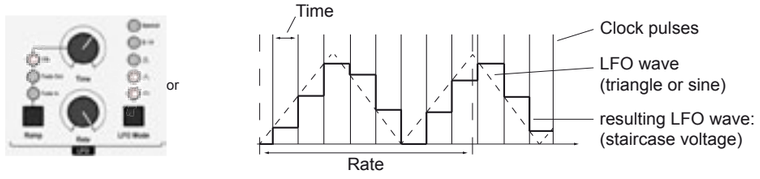


Fade in/out Modulation Mode (available waveshapes as above):

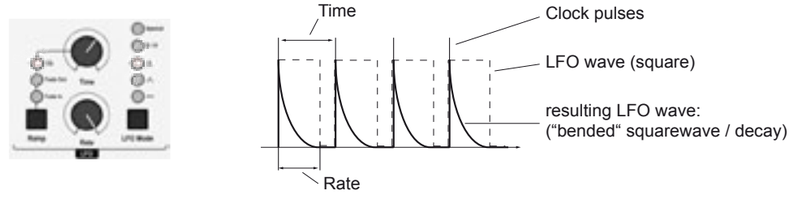


Clock Mode (different complex waveshapes, depending on ”Mode” setting):

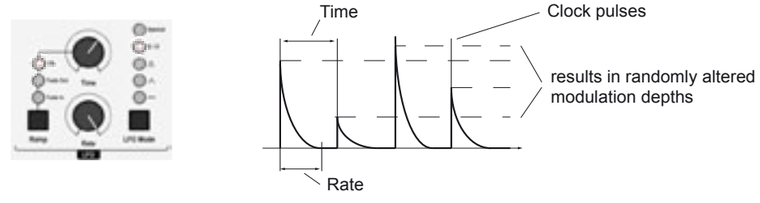
Staircase voltage:



”Bended“ squarewave (decaying shape):



Random Modulation:



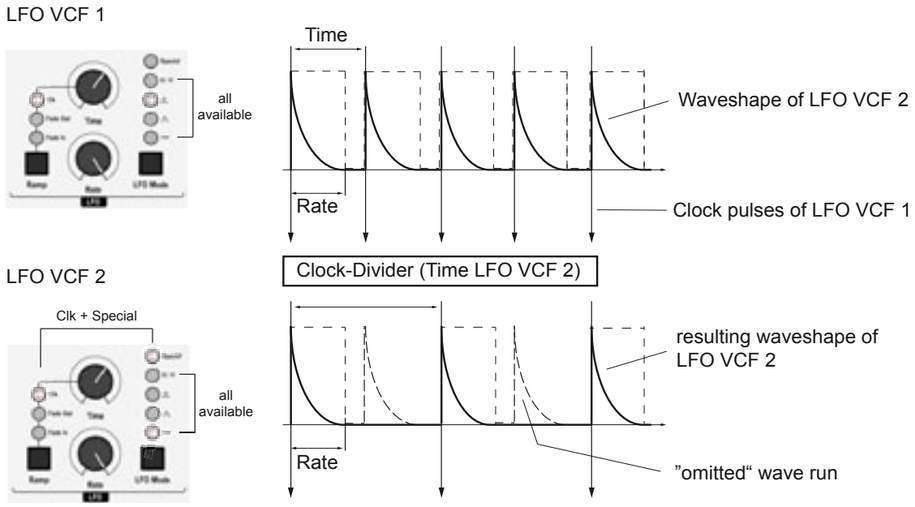
LFO synchronisation:

LFO VCF 2 can be synchronised to LFO VCF 1. LFO VCF 1 produces a clock signal that is run through a divider and then fed into LFO VCF 2. That way, both LFOs cannot only run in sync but also at different frequency ratios.

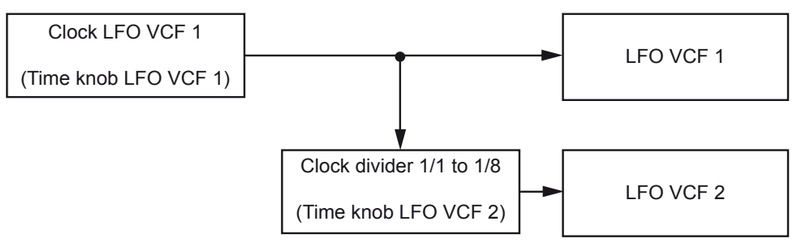
This is how to enable the sync function:

1 - Select **Ramp =** ”***CLK***” on both LFOs.
2 - Select any waveshape (”**LFO Mode**” key) on LFO VCF 1. This setting, in combination with the LFO 1 **Rate** setting, determines the waveshape that modulates VCF 1.
3 - Select desired waveshape of LFO VCF 2 (”**Mode**“). This setting, in combination with the LFO 2 **Rate** setting, determines the waveshape that modulates VCF 2.
4 - Hit **Ramp** in LFO VCF 2 again. The ”***SPECIAL***“ LED lights up and indicates that both LFOs are now running in sync.
5 - Alter **Mode** (waveshape), **Rate** and **Time** settings of both LFOs as you please.

The following figure shows the interaction of both LFOs when sync is active.



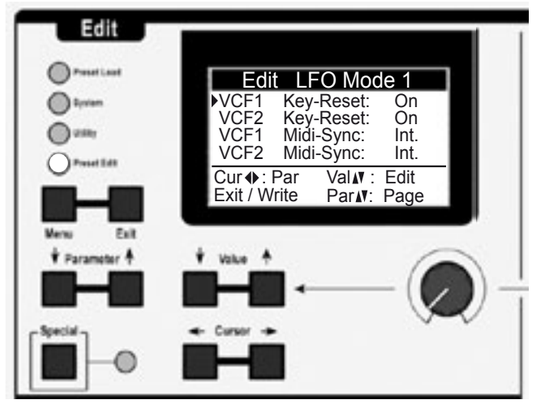
”Rate” and ”Mode” determine the waveshapes, ”Time” determines the master clock resp. clock divider.



Please bear in mind that you can swap or mix both LFO signals using the **Source** keys. Really wild modulation is waiting for you.

MIDI-clock sync:

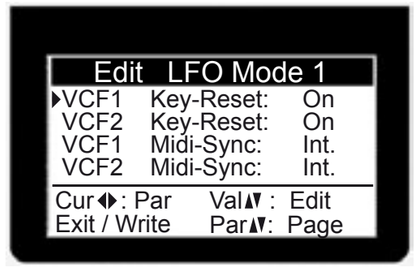
Both LFOs can be synced to MIDI clock. These settings have to be executed using a menu. Please have a closer look at the Edit section on Schmidt‘s panel.



1 - Hit the **Menu** Key until the ***PRESET EDIT*** LED lights up. You are in the Preset Edit menu now.
2 - Hit **Parameter up/down** keys to turn the menu pages until you enter the second page of the Preset Edit menu.

Now the LCD shows the following screen:

Use this page to set the sync options of the LFOs of VCF1/2:

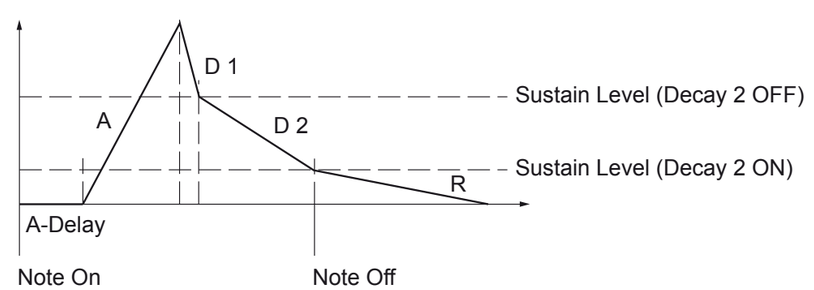


- ***Key-Reset***: restarts the VCF1/2 LFOs via note-on information.
- ***MIDI-Sync***: synchronizes VCF1/2 LFOs to MIDI clock. When enabled, you can select between 13 different clock divider ratios. „***INT***.“ means MIDI clock sync is disabled.
- ***Cursor left/right***: Previous/next function
- ***Value up/down***: Change value
- ***Exit:*** Quits Edit LFO Mode 1 page.

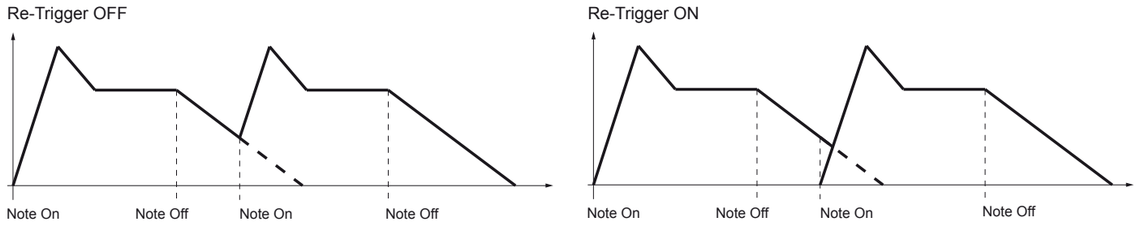
Envelope controls:

The envelopes ENV 1 and ENV 2 apply a modulation curve to the cut-off frequency of VCF 1 or VCF 2 respectively.

The following figure shows the envelope curve and its time and level parameters:



- **Trigger Delay**: Delays the start of the ***Attack*** phase.
- **Attack**: Adjusts rise time from zero to maximum level.
- **Decay 1**: Adjusts fall time from maximum level to ***Sustain*** Level
- **Sustain**: Adjusts ***Sustain*** level.
- **Decay 2** (control): Adjusts fall time from ***sustain*** level before receiving note-off message.
- **Decay 2** (key): Enables / disables ***Decay 2*** phase.
- **Release**: Adjusts fall time from sustain level after receiving note-off message.
- **Re-Trigger**: Retriggers the envelope if a new note-on message is received before the previous envelope duty circle has been completed fully.
  OFF: Envelope starts at the current level of the previous envelope duty cycle.
  ON : Envelope starts at zero level.



- **Destination**: Determines which envelope modulation parameter is affected by keyboard velocity:
  OFF: No keyboard velocity on envelope parameters.
  DEPTH: Keyboard velocity controls envelope modulation depth.
  ATTACK: Keyboard velocity controls Attack phase.
  DECAY: Keyboard velocity controls Decay phase.
- **Velocity**: Adjusts the effect of the keyboard velocity control on the parameters listed above. Negative values invert the effect.

Please note: Do not confuse this with the cut-off modulation control also named ”Velocity” (see above).

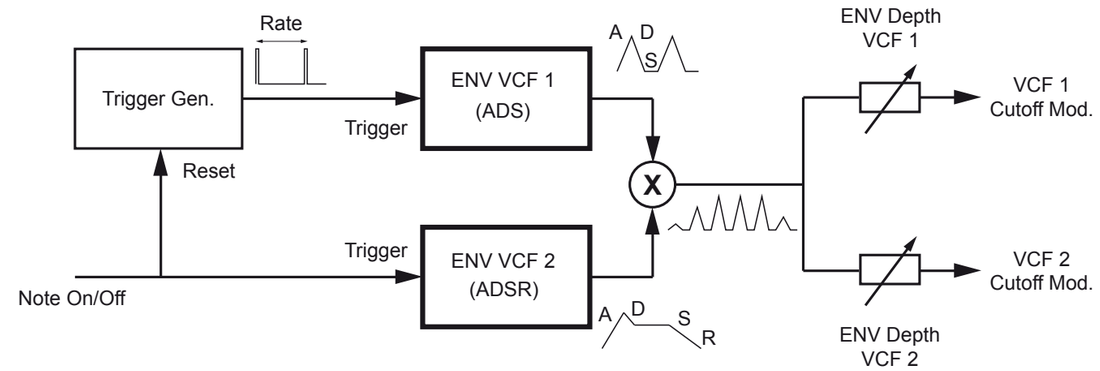
Envelope Trigger Repeat:

If Trigger Repeat is enabled, a trigger generator becomes active which continuously retriggers Envelope 1 as soon as a note-on message comes in. This results in a gate-like chopping effect. Its shape can be controlled by ***Attack***, ***Decay***, and ***Sustain*** parameters of envelope 1 (***Trigger Delay***, and ***Release*** become inactive).
The intensity is adjusted individually for VCF 1 and VCF 2 by the ***ENV Depth*** controls. Envelope VCF 2 generates its usual ADSR shape that is now controlling the intensity of the effect dynamically. This way you can fade the chopping effect in and out.

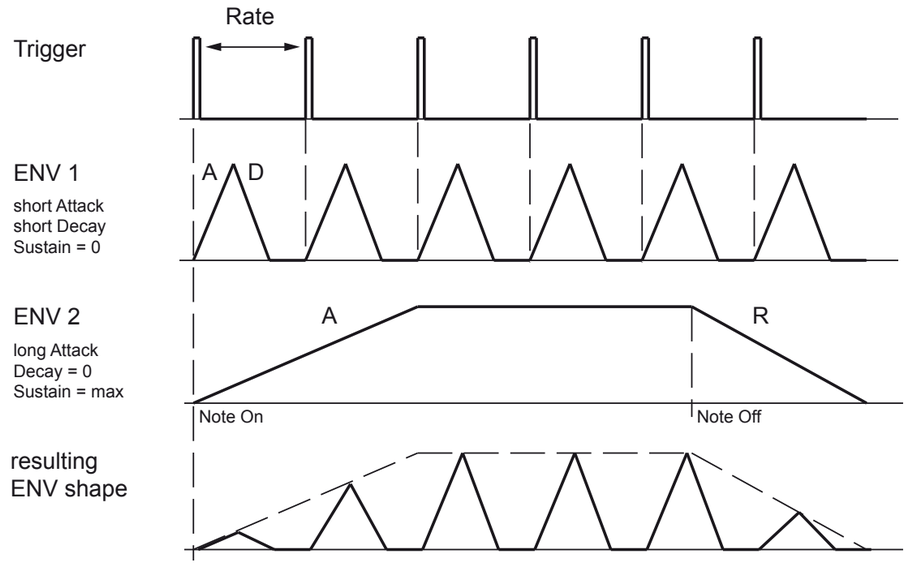
- **Trigger Repeat** (VCF 2): Enables the Envelope Trigger Repeat function.
- **Rate** (VCF 2): Controls the frequency of the ***Trigger Repeat***.

The following two figures explain the function of the Trigger Repeat:

Operation principle of the filter envelope trigger generator:



Operation example of the filter envelope trigger generator:



Level B Mod controls:

This section controls the level of the VCF input B. It is a kind of ”mini envelope / LFO combination”. This feature can be very useful especially when input B is used for cut-off modulation (please refer to section Group In on page 36, 37). That way you can fade the modulation effect in and out.

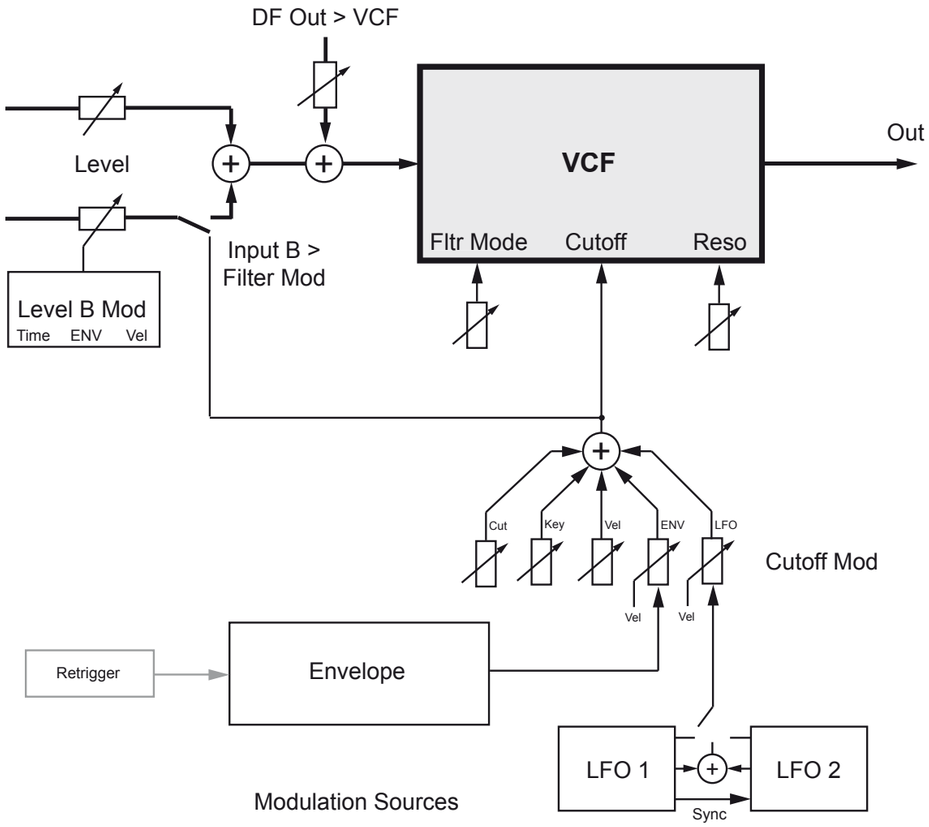
- **ENV**: Determines the shape of the modulation:
  /I: Rising ramp (one shot)
  I: Falling ramp (one shot)
  /\/: Triangular waveshape (continuous)
- **Time**: Adjusts the modulation rate.
- **Velocity**: When enabled, keyboard velocity affects modulation depth.

Filter modulation summary:

In order to grasp this rather complex operation fully, please memorize the following figure: It shows the audio signal path and all modulation paths of the VCF:

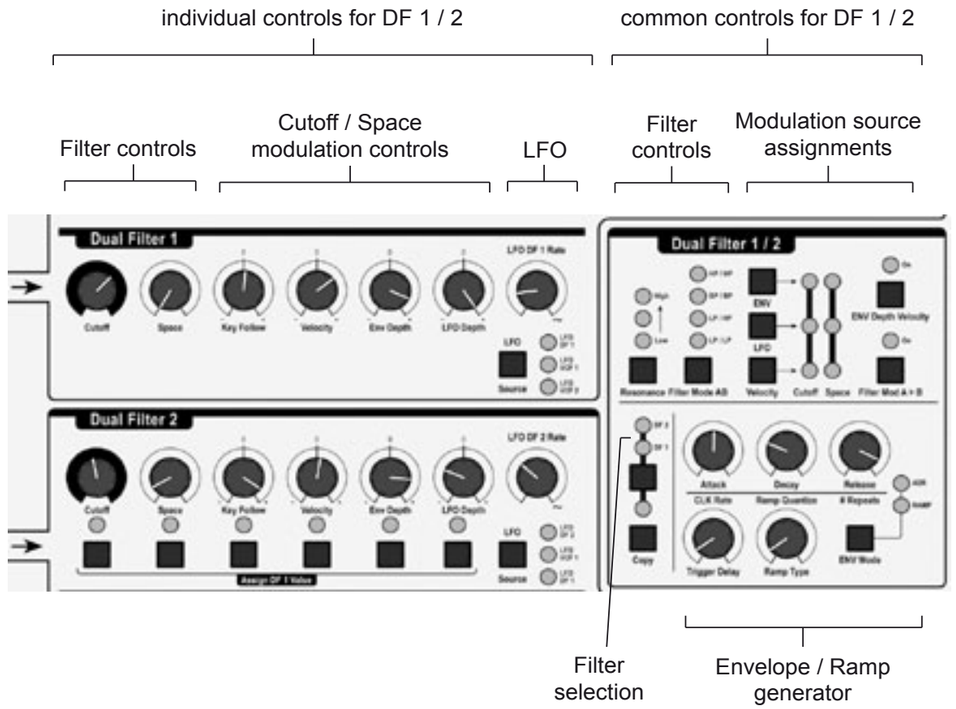
- Audio runs from inputs A and/or B through the filter where it is processed further.
- Input B level can be modulated (***Level B Mod***) and/or used for cut-off modulation in the audio range (***Input B > Filter Mod***).
- The output signal of the Dual Filter can be mixed into the VCF input (***DF Out > VCF***).

In the lower half of the following figure the cut-off modulation sources are displayed: The envelope with its retrigger generator as well as LFO VCF 1 and LFO VCF 2. Last but not least, the different modulation depth controls (***Cutoff***, ***Key Follow***, ***Velocity***) are listed, along with the VCF envelope and LFO(s).



DUAL FILTER 1 / 2

Dual Filter 1 and 2 are structured identically. Each of the to Dual Filters offers a pair of parallel multi-mode (state-variable) filters with 12 dB slope each and variable resonance. Each half of the filter section uses its own input (A and B).
Cutoff and Space can be adjusted separately for each part of the filter section, resonance and response characteristics are governed by a common control for both filters and a selector key. Modulation sources are keyboard velocity as well as one LFO and one envelope / ramp generator. The latter is shared by Dual Filter 1 and Dual Filter 2. Instead of the internal LFOs, both VCF LFOs can be used as modulation sources.



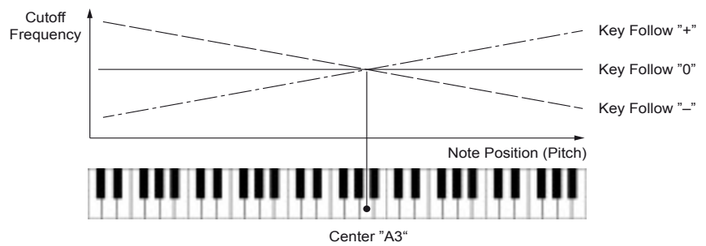
Individual controls for DF 1 and DF 2:

Filter controls:

- **Cutoff**: Cut-off frequency
- **Space**: Spacing between the respective cut-off frequencies of the two filter sections.

Cutoff / Space modulation controls:

- **Key Follow**: Adds key position to the cut-off modulation amount. Negative values will invert the effect.



- **Velocity**: Adds keyboard velocity to the ***cut-off*** / ***space*** modulation amount. Negative values will invert the effect.

- **Env Depth**: Adds envelope / ramp generator modulation to ***cut-off*** / ***space*** modulation amount. Negative values will invert the shape of the envelope / ramp.
- **Assign DF 1 Value**: (six keys, only DF 2) If enabled, the related parameter uses (copies) the value setting of DF 1.

Again, all values are added to the resulting modulation depth. Please refer to page 59.

LFO controls:

- **LFO Depth**: Adds LFO modulation to ***cut-off*** / ***space*** modulation amount. Negative values will invert the effect of the LFO curve.
- **LFO DF Rate**: LFO modulation rate.
- **LFO Source**: Selects the LFO that is modulating the Dual Filter:
  LFO DF 1
  LFO VCF 1
  LFO VCF 2

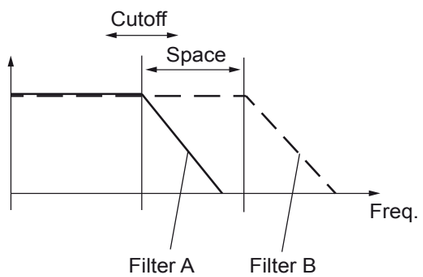
When LFO VCF 1 or 2 is selected, all sync features of these LFOs can be used in conjunction with the Dual Filters.

Common controls for DF 1 / 2:

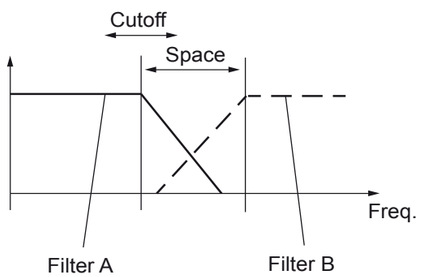
Filter controls:

- **DF1 / DF2**: Assigns all following functions to DF1 or DF2. If both **LEDs** light up, DF2 temporarily uses the settings of DF1. Switching back to LED ***DF1***, reverts to DF2s individual settings.
- **Copy**: Hitting the Copy key twice copy/pasts the current settings to the respective other Dual Filter.
- **Resonance**: Resonance intensity can be selected in seven steps.
- **Filter Mode AB**: Selects the response characteristics of both filter sections:
  LP / LP: Both filter sections = lowpass. Producing a 24 dB low-pass filter.
  LP / HP: Filter A = lowpass, filter B = highpass. Producing a notch filter.
  BP / BP: Both filter sections = bandpass. Producing a comb filter.
  HP / HP: Both filter sections = highpass. Producing a 24 dB high-pass filter.

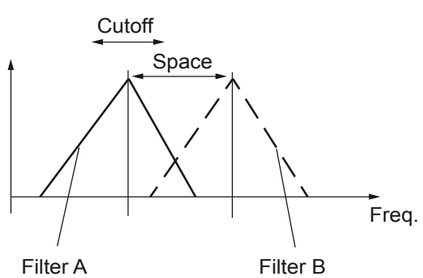
LP / LP => LP



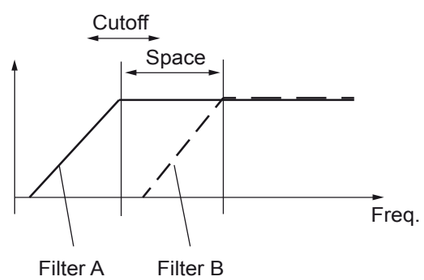
LP / HP => Notch



BP / BP => Comb



HP / HP => HP



Modulation source assignments:

- **Velocity**: Keyboard velocity modulates ***cut-off*** or ***space***.
- **LFO**: LFO modulates ***cut-off*** or ***space***.
- **ENV**: Envelope / Ramp modulates ***cut-off*** or ***space***.
- **Filter Mod A->B**: Output signal of filter section A modulates ***cut-off*** frequency of filter section B.
- **ENV Depth Velocity**: Envelope modulation depth is controlled by keyboard velocity.

Envelope / Ramp generator:

The Envelope / Ramp generator is a modulation source that produces an ADR envelope for shaped modulation or 32 waveshapes for complex continuous modulation of cut-off or space.

- **ENV Mode**: Selects the operation mode of the Envelope / Ramp generator:

  => ***ADR - ENVELOPE GENERATOR MODE*** (shaped modulations). The controls have the following functions:

  Trigger Delay: Delays the start of the Attack phase.

  Attack: Adjusts rise time from zero to maximum level.

  Decay: Adjusts fall time from maximum level before note-off is received.

  Release: Adjusts fall time after note-off is received.

  => ***RAMP - RAMP GENERATOR MODE***. (continous modulations). The controls have the following functions:

  Ramp Type: Selects 32 different waveshapes.

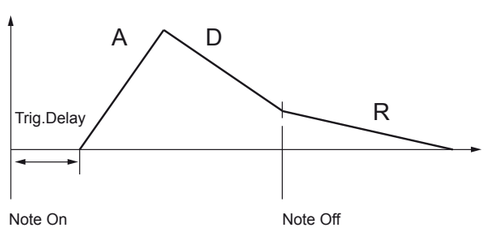
  CLK Rate: Modulation frequency.

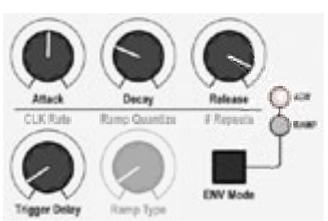
  Ramp Quantize: Smoothes the selected waveshape. Available settings (shown in the LCD in Schmidt‘s Edit section):

  SQUARE: ”Edgy” waveshape
  MIX 1-3: Three settings with increasingly smoothed waveshapes.
  RAMP: Rounded, slewed waveshapes
  # REPEATS: Determines the number of envelope duty cycles from ***ONE*** to ***EIGHT*** (shown in the LCD).
  With each repeat, the modulation depth fades out gradually. Great for ”echoing” effects. If value is set to ”***CONT***”, the modulation is generated continuously just like a conventional LFO but with more complex waveforms.

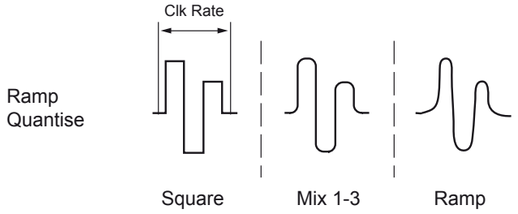
The following two figures explain both modes, their parameters, and their possible settings:

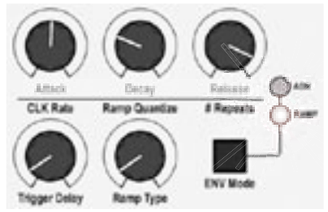
ADR Mode

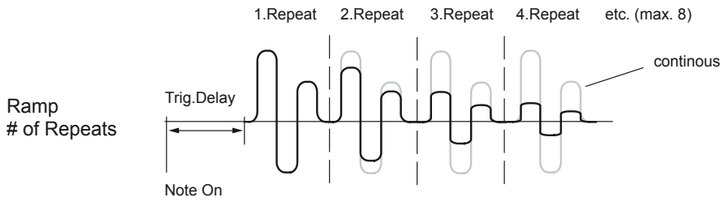




Ramp Mode



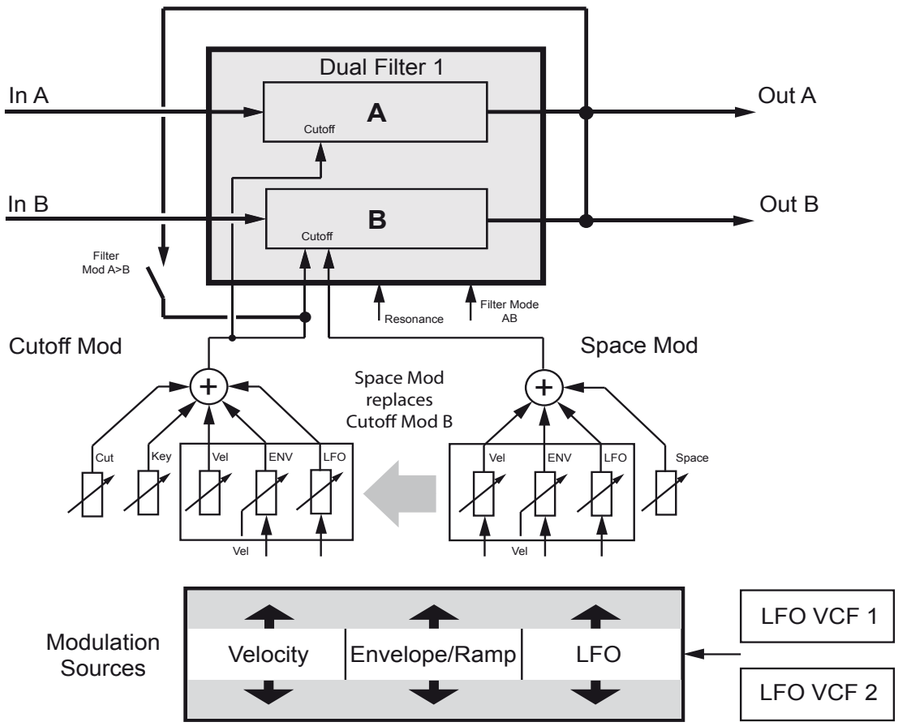




Dual Filter Signal Flow / Modulation Routings:

In order to grasp yet another complex section, please memorize the following figure. It shows the audio signal path and all modulation paths of Dual Filter 1. Dual Filter 2 works exactly the same way.

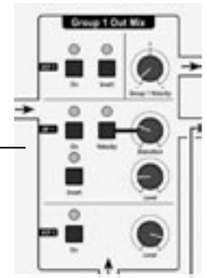
Audio is sent into inputs A and/or B, processed and then sent to the outputs A and B. Modulation destinations are ***cut-off*** and ***space***. The available modulation sources are combined and fed into the mod inputs of the filter sections A and B. Apart from that, the output signal of filter A can be fed back into the cut-off modulation input of filter B (**Filter Mod A->B** key). ***Resonance*** and ***Filter Mode AB*** cannot be modulated.



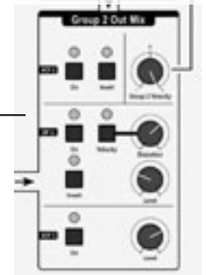
GROUP OUTPUT MODULES

The Group Output modules come after the filter section. They sum all filter output signals into a stereo signal. You should be already familiar with the signal path – if you might need a recap, please refer to page 12.
The controls for Group 1 Out Mix and Group 2 Out Mix are identical.

Group 1 Out Mix
mixer for filter outputs
Group 1



Group 2 Out Mix
mixer for filter outputs
Group 2



- **VCF 1 ON**: Enables / disables the output of VCF 1.
- **VCF 1 Invert**: Inverts the output phase of VCF 1.
- **Group 1 Velocity**: Keyboard velocity controls output level of Group 1. Negative values will invert the effect.
- **DF 1 ON**: Enables / disables the outputs of Dual Filter 1.
- **DF 1 Invert**: Inverts the output phase of Dual Filter 1.
- **DF 1 Level**: Controls the output level of Dual Filter 1.
- **Distortion**: Distorts the output signal of Dual Filter 1.
- **Velocity** (control): Puts distortion amount under the control of keyboard velocity.
- **VCF 3 ON**: Enables / disables the output of VCF 3.
- **VCF 3 Level**: Controls the output level of VCF 3.

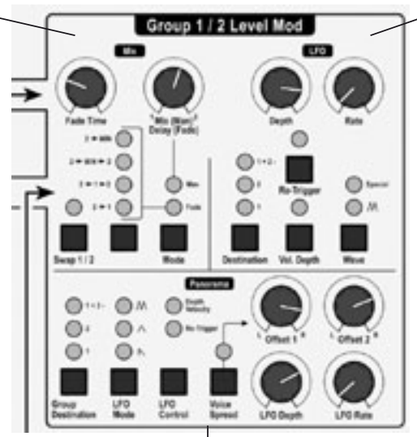
Group 2 controls work exactly the same way.

GROUP 1/2 LEVEL MOD

Schmidt‘s advanced architecture allows you to tap two different sound variations at the Group outputs – why not toy around with them a bit? Here we go: Since both Group outputs are routed to one stereo channel, the volume of both signals can easily be modulated or swept across the stereo panorama respectively. That is exactly what Group 1/2 Level Mod does.

Mix
crossfade of
output signales
of Group 1 / 2

LFO
LFO for crossfade
modulation



Panorama
panorama control of stereo sum
with LFO panning

MIX

The Mix controls a cross-fade between both signal outputs of Group 1 and 2 or fades them in and out separately.

- **Mode**: Determines whether the (cross)fade is performed manually (”***MAN***“) using the **Mix/Delay** control or automatically (”***FADE***“).

- **Mix/Delay**: - If **Mode** key is set to ”***MAN***”, this control governs the cross-fade manually.
  - If **Mode** key is set to ”***FADE***“, this control governs the delay time before the fade starts.

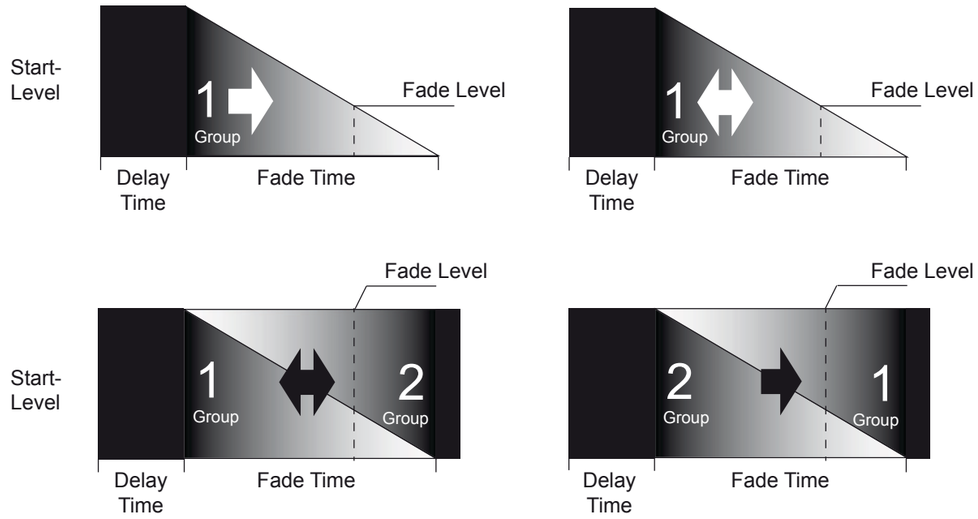
The current value setting before the **Mode** key is switched to “***FADE***“ determines the sweep level or the minimum level of the Group controlled by the sweep respectively.

- **Fade Time**: Duration time of the fade.

- **Fade** (key): Determines the direction of the sweep – please also refer to the following figure:
  - ***2 => MIN***: Group 2 from full level to Fade level while Group 1 is keeping its level constant.
  - ***2 => MIN => 2***: Group 2 from full level to Fade level and back to full level while Group 1 is keeping its level constant.
  - ***2 => 1***: Group 2 is cross-faded with Group 1.
  - ***2 => 1 => 2***: Group 2 is cross-faded to Group 1 and back to Group 2.

- **Swap 1/2**: Interchanges positions of both groups.

The following figure will illustrate the different (cross)fade options and their parameters:



LFO

The LFO controls add a level vibrato (tremolo) to both groups.

- **Rate**: Modulation frequency

- **Depth**: Modulation intensity

- **Wave**: Waveform selection of the LFO:
  - **/VV**: Triangular LFO waveshape
  - ***SPECIAL***: Space for future updates

- **Re-Trigger**: Note-on message restarts the LFO wave at a zero crossing.

- **Vel. Depth**: Adds keyboard velocity to the level modulation amount.

- **Destination**: Determines the destinations of the level modulation. The following options are available:
  - ***NO LED***: LFO modulation disabled.
  - ***1***: Modulation on Group 1.
  - ***2***: Modulation on Group 2.
  - ***BOTH LEDS 1 + 2*** Modulation on Group 1 and 2 with identical phase.
  - ***1+2–*** : Modulation on Group 1 and 2 with inverted phase.

PANORAMA

The Panorama controls govern stereo panning of both groups by a dedicated LFO.

- **Offset 1**: Stereo position of Group 1.

- **Offset 2**: Stereo position of Group 2.

- **Voice Spread**: Spreads out Schmidt‘s eight voices across the stereo field. The width of the stereo field is determined by the ***Offset*** values.

- **LFO Rate**: Modulation frequency

- **LFO Depth**: Modulation intensity

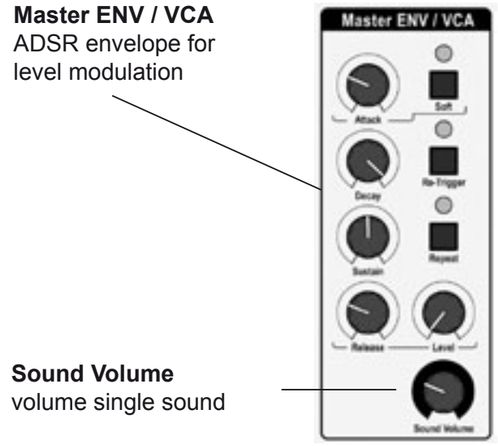
- **LFO Mode**: Determines the movement of the Group signals within the stereo field:
  /VV: Continuous panning (triangular waveshape).
  I: One movement from left to right / vice versa and back (one shot saw-tooth waveshape). Enables ***Re-Trigger*** automatically.
  /: One movement from left to right / vice versa and back (one shot triangular waveshape). Enables ***Re-Trigger*** automatically.

- **Re-Trigger**: Note-on message restarts the LFO wave within a zero crossing (triangular waveshape). Always active when LFO one-shot waveshapes are enabled.

- **Group Destination**: Determines the destinations of the panning modulation:
  NO LED: LFO panning modulation disabled.
  1: Panning modulation on Group 1.
  2: Panning modulation on Group 2.
  Both LEDs 1 + 2: Panning modulation on Group 1 and 2 with identical phase.
  1+2– : Panning modulation on Group 1 and 2 with inverted phase.

MASTER ENV / VCA

This is the main VCA controlled by the master envelope generator. It shapes the volume contour of the entire sound and determines the output volume of a single sound.



- **Attack** (control): Adjusts rise time from zero to maximum level.

- **Soft** (key): Softens the initial state of the attack time in order to avoid audible artefacts when wide note sweeps are played. Very useful with longer attack times.

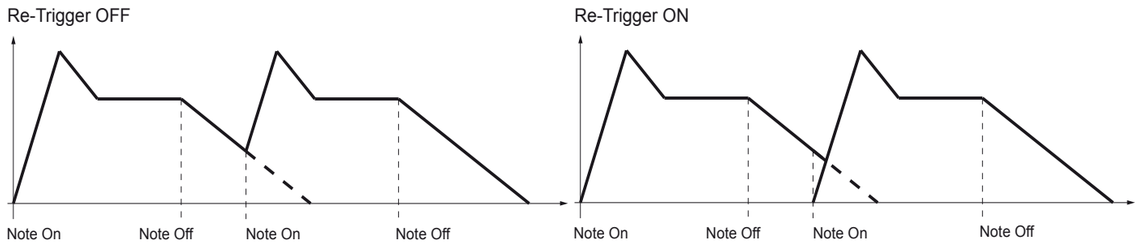
- **Decay**: Adjusts fall time from maximum level to Sustain Level.

- **Sustain**: Adjusts Sustain level.

- **Release**: Adjusts fall time from sustain level after note-off message.

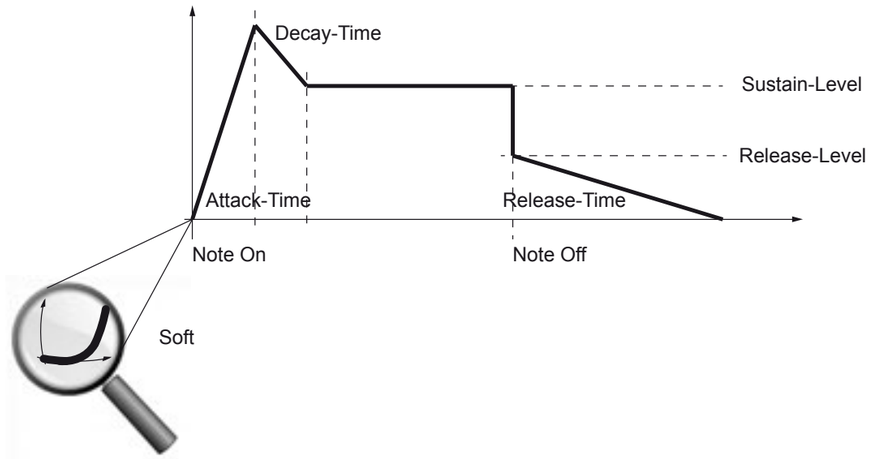
- **Level**: Starts the release state below the selected sustain level. When used e.g. with percussive sounds, it produces some kind of ”reverb tail“-effect instead of the familiar fading sound.

- **Re-Trigger**: Determines the start of the envelope when a new note-on message is received before the previous envelope duty cycle has been completed.
  OFF: Envelope starts at the current level of the previous envelope cycle.
  ON: Envelope starts at zero level.



- **Repeat**: Repeats (loops) the envelope infinitely (not yet implemented – please check www.emc-de.com for updates).

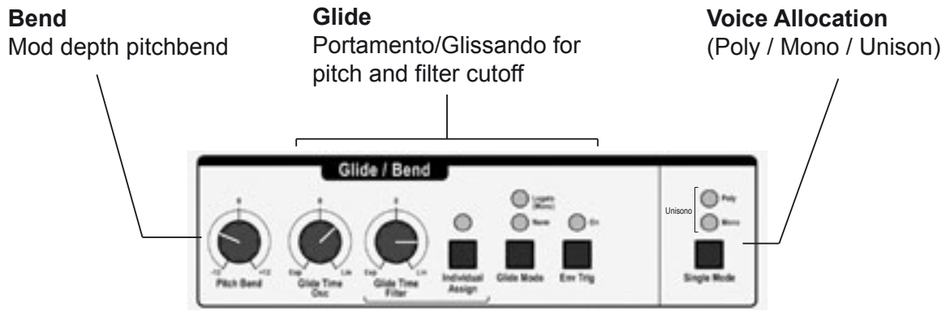
The following figure shows the parameters of the master envelope:



- **Sound Volume**: Determines the volume of the active single sound. This setting is stored within a preset and is overwritten by turning the global **Volume** / **Phones** controls.

GLIDE / BEND

This section controls the glide / portamento effect for both pitch and filter cut-off frequency as well as the note allocation in single mode. Let‘s start with the latter.



Voice Allocation

- **Single Mode**: Determines Schmidt‘s voice allocation when running in single mode.
  POLY: Eight-voice polyphonic
  MONO: Monophonic (last note priority)
  BOTH LEDS: Unison mode (eight voices stacked on just one key – last note priority).

In Unison mode (both LEDs on), the **Master Tune** control (left of the keyboard) determines the detuning of the eight voices. This setting is stored within a preset. To tune such an unison-preset, switch **Single Mode** to ***MONO***, tune the preset with the **Master Tune** control and return to ***UNISON***.

Glide / Bend

Depending on the mode selected, glide options and envelope response can be changed:

- **Glide Mode**: Turns Glide On/Off or selects its response respectively:
  NO LED: Glide disabled.
  NORM: Glide enabled. Active with every note trigger.
  LEGATO: Glide only active when playing legato-style (only available in Mono and Unison modes!)

- **Env Trig**: Usually set to ***ON***. If ***Glide Mode*** is set to ”***LEGATO***“, this key can be used to enable the triggering of all envelopes.

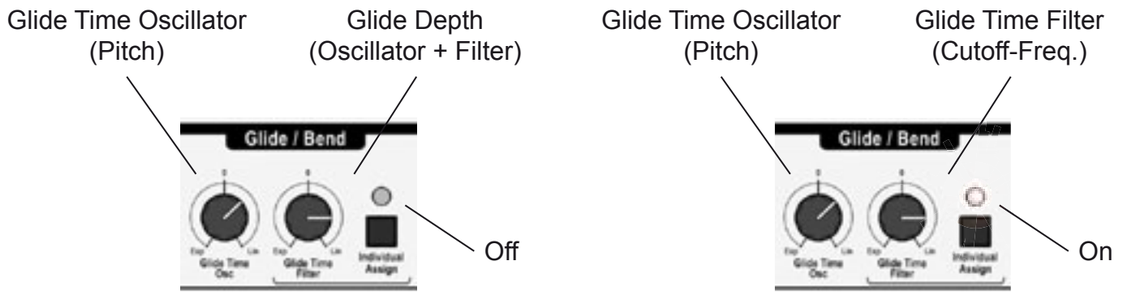
- **Pitch Bend**: Sets the range of the pitch bend wheel (up to 12 semitones). Negative values invert the effect of the pitch bender. Depending on a global setting (page 74), this value works just for the current preset or on a global level.

- **Glide Time Osc**: Glide duration of the Oscillator pitch.

- **Glide Time Filter**: - Glide duration of the filter cut-off (if ”**Individual Assign**“ is set to ***ON***).
  or
  - Glide depth of pitch and cut-off (if ”**Individual Assign**“ is set to ***OFF***).
  In both settings, the glide effect can have different gradations:
  EXP: The glide time is directly proportional to the interval played.
  LIN: The glide time is independent of the interval played.

- **Individual Assign**: Controls the assignement function to pitch and filter cut-off:
  OFF: Oscillator pitch glide and filter cut-off glide are both controlled simultaneously by the **Glide Time Osc** control. The **Glide Time Filter** control governs Glide Depth.
  ON: Oscillator pitch glide is governed by the **Glide Time Osc** control.
  Filter cut-off glide is governed by the **Glide Time Filter** control.

The following figure shows the different function states of the Glide / Bend controls in relation to the **Individual Assign** control setting:



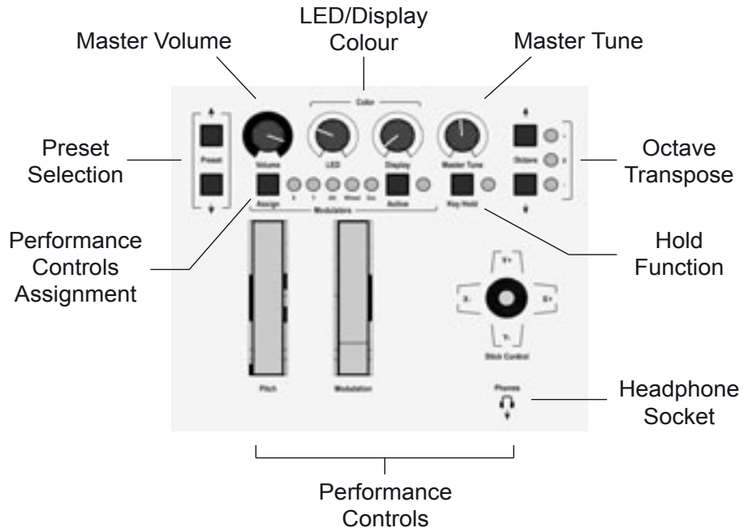
What is "Glide Depth"?

As mentioned above, the **Glide Time Filter** control governs a parameter we call "***Glide Depth***". When playing polyphonically, a standard glide function can sound quite extreme, especially when playing wide intervals using a high portamento rate. With "Glide Depth" you can attenuate the glide effect.

An example: Set **Individual Assign** to ***ON*** and choose a medium value for ***Glide Time Osc***. Play some monophonic lines using wide intervals first and listen to the glide effect. So far, so well. Now, please play some chord changes, also using wide intervals. The result might not be all that satisfying as it takes a while for the respective pitches to fall into place.
Now disable **Individual Assign**. The **Glide Time Filter** control becomes the control of ***Glide Depth***. Set ***Glide Depth*** value to e.g. "***2 SEMITONES***" and play the chords again. You will notice that the glide effect is much less intense but musically a lot more useful. This is because the polyphonic notes use a much smaller sweep interval (in this example a maximum of two semitones rather than a full octave or the like) than monophonic notes, played without using the Glide Depth parameter.

REALTIME CONTROLS

We will now have a look at the panel to the left of the keyboard. Essentially, it features Schmidt's performance controls and some interfacing to assign them to parameters of a sound.



- Preset Up/Down: Steps through the preset bank selected. Duplicates the **Preset** keys in the Preset section. If required, enable ***Quick Load*** function.
- Volume: Controls the level of the main outputs. Duplicates the **Volume** control in the Global section.
- Colour: Adjust LED and LC-display color to suit your taste.
- Master Tune: Shifts the tuning of the entire instrument up or down by one semitone. If a preset is using ***unisono***-mode, this control detunes the voices. Please refer to page 59, section „Voice Allocation".
- Key Hold: When active, a note played will be indefinitely held at the sustain level of the volume envelope and sounds forever (or for the time you are away to make yourself a sandwich, have a shower, what have you).
- Octave: Shifts the keyboard range up or down by one or two octaves.

  The following figure shows the available setting for transposing up. Transposing down works the same way. The following settings are available:

no transpose 1 octave up 2 octaves up

Performance Controls

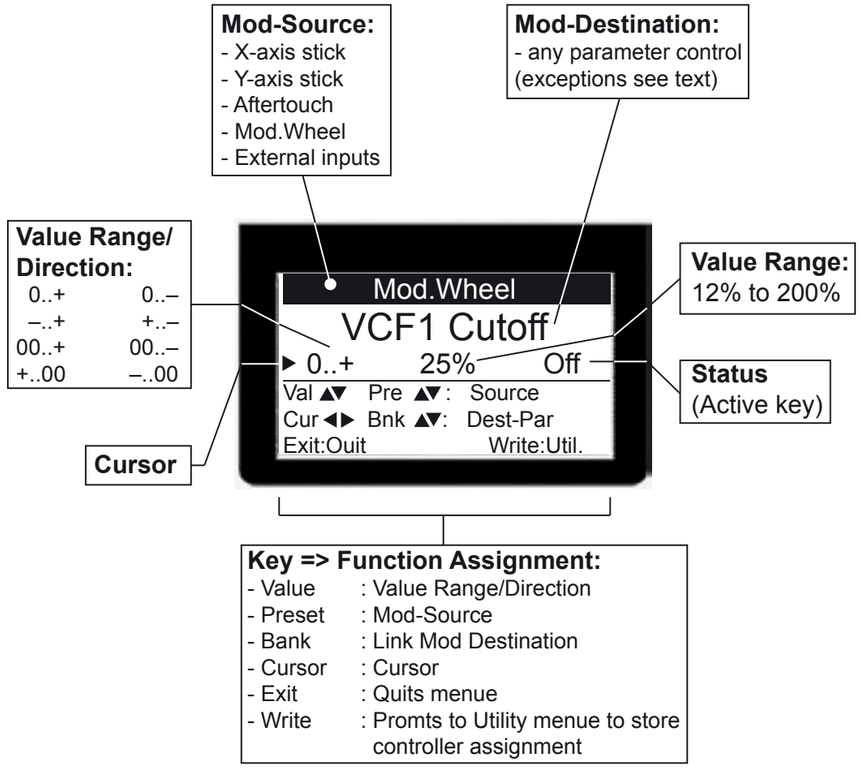
- Pitch: „Bends" the pitch. The range is programmable.
- Modulation: Controls a selectabl sound parameter. The range resp. modulation depth is programmable.
- Stick Control: Controls two selectable sound parameters (X/Y-axis) simultanously. The ranges are programmable.

Real time Controls Assignment

You can assign any of Schmidt's parameter controls to one of the real time performance controllers (stick, aftertouch, mod wheel and external input sockets).

Assignment

- **Assign**: Selects the real time control. The following options are available:
  - ***X***: Stick controller x axis
  - ***Y***: Stick controller y axis
  - ***AFT***: Keyboard aftertouch (pressure)
  - ***WHEEL***: Modulation wheel
  - ***EXT***: External input B sockets (expression pedal, control voltage)



This is how to assign a real time control to a parameter:

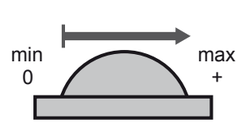
1 - Select a real time control, e.g. Mod-***WHEEL,*** using the **Assign** key.

2 - Now simply turn the control of the desired parameter of a sound, e.g. VCF1 **Cutoff**, to assign it to the real time control. The LCD shows the screen in the figure above:

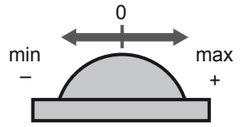
- The upper row shows the real time control resp. the modulation Source, e.g. ***Mod Wheel*** (already selected).
- The second row shows the parameter assigned, e.g. VCF1 ***Cutoff*** (already selected).
- The third row shows three parameters that can be selected by moving the **Cursor**. They define the functioning of the real time controllers.
  Hitting the **Value up/down** keys or moving the **Data dial** will change the corresponding values:

Controller Direction

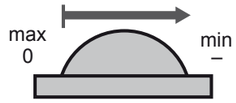
This parameter determines the response of the real time control selected. The LCD reads its values like e.g. " ***–0..+*** " or " ***–..+*** ". Eight different settings are available and determine the way the selected real time control works.
The following figure shows the different settings of the Mod Wheel as an example. Aftertouch and External Controllers work accordingly.

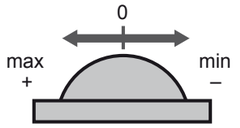


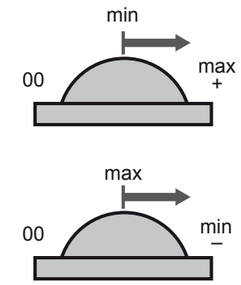
Settings: **0..+** **0..–**
Perf. Controller
whole range
from 0 to max/min



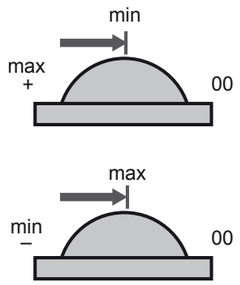
Settings: **–..+** **–..+**
Perf. Controller
whole range positive and
negative (center = 0)





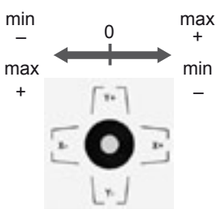


Settings: **00..+** **00..–**
Perf. Controller
half range
from center to max/min

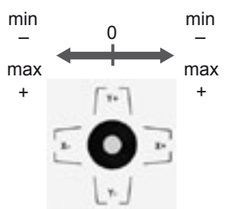


Settings: **+..00** **–..00**
Perf. Controller
half range
from max/min to center

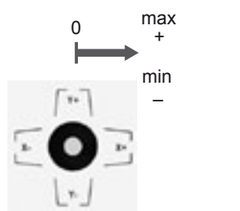
The stick controller and its available parameter settings work a bit differently. The following figure illustrates their operation with the X axis. Y axis works accordingly.



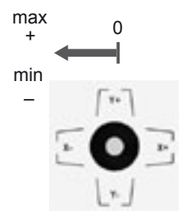
Settings: **–0+** **+0–**
Stick Controller X/Y
both directions positive/negative
(center = 0)



Settings: **–0–** **+0+**
Stick Controller X/Y
both directions positive or
negative (center = 0)



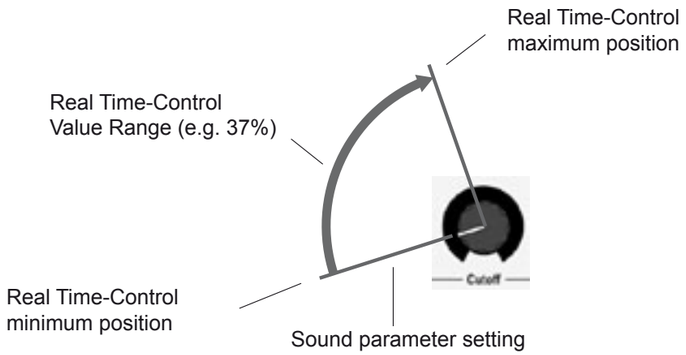
Settings: **00+** **00–**
Stick Controller X/Y
right/up positive or negative
(center = 0, left/down inactive)



Settings: **+00** **–00**
Stick Controller X/Y
left/down positive or negative
(center = 0, right/up inactive)

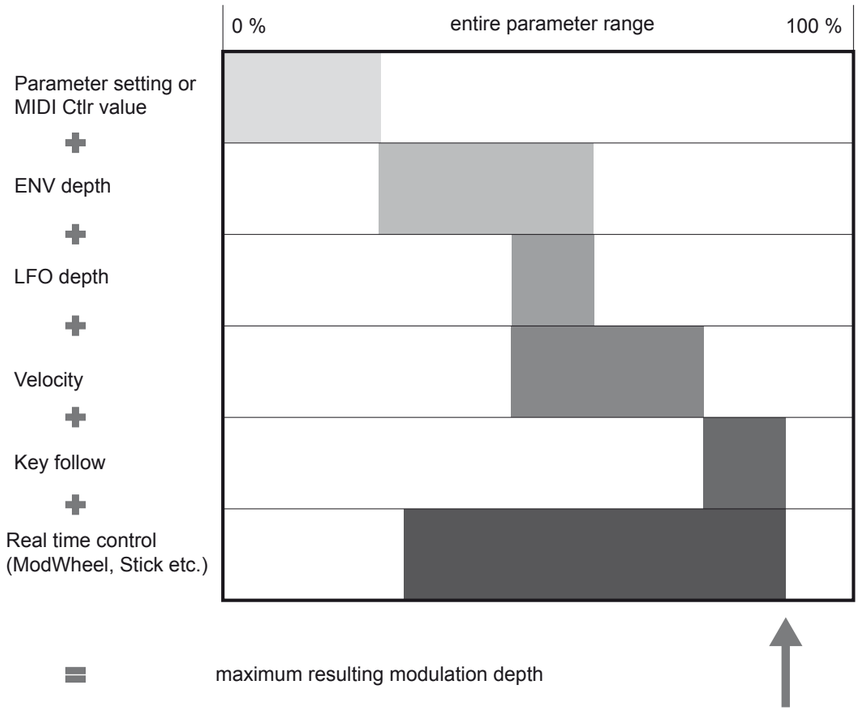
Controller Depth

This parameter is shown as a percentage value (e.g. ”***25%***“) and determines the real time controls modulation depth. Sixteen values from ***12%*** to ***200%*** are available. This value is added to the current control setting.



A word or two about modulation depth

Not only the current setting of the controls, but also all other parameters that control a modulation depth, are added to the resulting modulation depth value. Please note that modulation depth usually has negative values as well. If the resulting modulation depth value exceeds the total parameter range, some controllers may have little or no effect on the entire modulation.
When, for example, you set the VCF1 cut-off control to a 3 o‘clock position and add a high ENV depth value, an additional third controller will produce no audible effect until you decrease either of the two other settings. Please refer to the following figure. It shows the cumulated modulation depth values for the VCF1 cut-off. In this example, all added values are within the total parameter range.



Activate real time controllers

- **Active**: Enables the selected performance controller (LC display shows ”***ON***“ / ”***OFF***“). You can use this key to enable / disable specific performance controllers while playing.

At this point, the assignment process is completed. You can now continue by assigning another real time control to a specific parameter of a sound.

You can also use the **Preset** and **Bank** selector keys to determine the real time control and the desired parameter.

- **Preset up/down**: Selects performance controller (”***Source***“).
- **Bank up/down**: Selects sound parameter (”***Dest-Par***“).

1 – Use the **Cursor** keys to navigate through the parameters.

2 – Use the **Value** keys to change values (or the **data entry** dial).

3 – Hit the **Exit** key to quit the performance controller assignment procedure.

Store real time controller assignment

You can store the real time controller assignment to the current preset by simply performing the preset storage function:

1 – Hit the **Write** key to store the performance controller assignment in the current preset.
The LCD will read ”***WRITE ASSIGN DATA TO PRESET***?“

2 – Now hit ***Enter*** to save the performance controller assignment or hit ***EXIT*** to quit the performance controller assignment procedure without saving it in the current preset.

Please note: Some sound parameters are controlled in tandem by the real time controls. These parameters are listed right here:

Function Block	Parameter	LC-Display Readout (select with Bank key)
PWM	***OSZ1-LFO-Rate***	OSC1,OSC123
PWM	***OSZ1-LFO-Depth***	OSC1,OSC123
--		
Envelope	***ENV Depth***	OSC1,OSC2,OSC3,OSC4,OSC1234
Envelope	***ENV Time***	OSC1,OSC2,OSC3,OSC4,OSC1234

Vibrato	***Vib Depth***	OSC1,OSC2,OSC3,OSC4,OSC1234
Vibrato	***Vib Rate***	OSC1,OSC2,OSC3,OSC4,OSC1234

Oscillator 4	***Fine Tune***	Fine Tune , Vel Sens, Key Follow
---		
VCF1	***Cutoff***	Cutoff VCF1, Cutoff VCF12

Dual Filter 1	***Cutoff***	Cutoff DF1, Cutoff DF 12
Dual Filter 1	***Space***	Space DF1, Space DF 12
Dual Filter 1	***Key Follow***	Key F. DF1, Key F. DF 12
Dual Filter 1	***Velocity***	Vel DF1, Vel DF 12
Dual Filter 1	***ENV Depth***	ENV DEpth DF1, ENV DEpth DF 12
Dual Filter 1	***LFO Depth***	LFO DEpth DF1, LFO DEpth DF 12
Dual Filter 1	***LFO Rate***	LFO Rate DF1, LFO Rate DF 12

Dualfilter 1/2	***Trigger Delay***	T.Delay DF1, T. DF12
Dualfilter 1/2	***Attack***	Attack DF1, Attack DF12
Dualfilter 1/2	***Decay***	Decay DF1, Decay DF12
Dualfilter 1/2	***Release***	Release DF1 Releaee DF12,

PRESET EDIT MENU

You will find most of Schmidt‘s parameters directly on the front panel. Still, there are some hidden functions in some easy-to-access/operate menus. Most of them allow access to global functions but some additional parameters for sound programming are to be found there as well. We will take a closer look at them right now. All corresponding function keys can be found in the Edit section located around the LCD.

The Preset Edit menu features just three pages.

Hit the **Menu** Key until the ***PRESET EDIT*** LED lights up. The LCD now shows the following screen. If not, change the pages using the **Parameter up/down** keys.

Naming Single Presets (Edit Single Name)

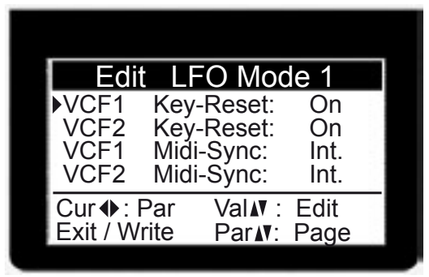
Use this page to name your new creation.

- Value up/down: Change character
- Cursor left/right: Previous/next character
- Preset down: Delete character
- Preset up: Insert character
- Bank down: Toggles between capital and small letters
- Bank up: Reloads the previous name.
- Exit: Quits Edit Single Name page
- Write: Saves settings in current preset

Additional LFO Parameters (Single LFO Mode 1)

Hit **Parameter up/down** keys to enter the second page of the Preset Edit menu.

Use this page to set the sync options of the VCF1/2 LFOs.

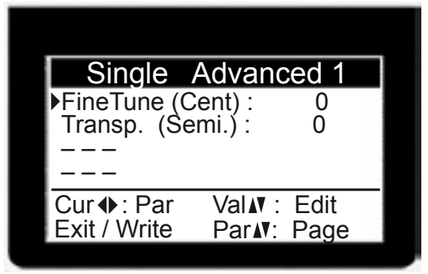


- Key-Reset: retriggers the VCF1/2 LFOs via note-on information (factory default setting is ***ON***).
- MIDI-Sync: synchronizes VCF1/2 LFOs to MIDI clock. When enabled, you can select from 13 different clock divider values (factory default setting is ***INTERNAL***, respectively disabled MIDI clock sync).
- Cursor left/right: Previous/next function
- Value up/down: Change value
- Exit: Quits Edit LFO Mode 1 page.

Additional Single Parameters (Single Advanced 1)

Hit **Parameter up/down** keys to enter the third page of the Preset Edit menu.

Here you will find some additional parameters that can be handy to have around from time to time, especially when programming single presets. Currently, you will find the following parameters:



- Fine Tune: tunes the current preset by cents. Using this function, you can give any preset an individual fine tuning. Please note that this setting is only active with this preset – it is not a global tuning parameter.
- Transpose: tunes the current preset by semitones. Using this function you can give any preset an individual transposition. Please note that this setting is also only active with this preset – it is not a global tuning parameter.
- Cursor left/right: Previous/next function
- Value up/down: Change value
- Exit Quits Single Advanced 1 page.

IV.

GLOBAL FUNCTIONS

GLOBAL FUNCTIONS

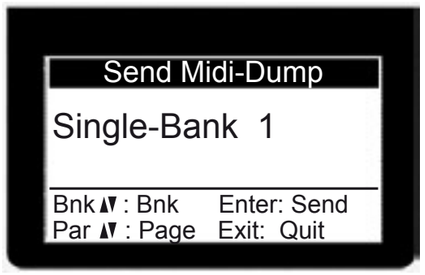
The global functions provide settings that are not preset related. The global functions provide the Utility Menu and the System Menu.

UTILITY MENU

Here you will find Schmidt‘s utility functions. Hit the **Menu** key until the ***UTILITY*** LED lights up. The LCD now shows the following screen. If not, change the pages using the **Parameter up/down** keys.

Send MIDI Dump

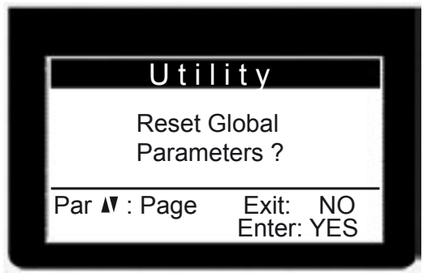
This function allows you to send banks of Single Presets as SysEx data file to external MIDI gear or your computer respectively.



- Bank up/down: Selects Single Preset bank (***1*** – ***8***) to be transmitted.
- Enter: Perform MIDI dump.
- Exit: Quits Send MIDI Dump page.

Reset Global Parameters

Hit Parameter up/down keys to enter the second page of the Utility menu.



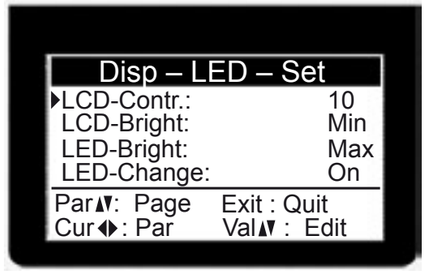
This function resets all global parameters to their factory default settings.

- Exit: Aborts the reset function.
- Enter: Performs the reset function.

Display / LED Settings

Hit Parameter up/down keys to enter the third page of the Utility menu.

Here you can adjust brightness, contrast, and color of the LEDs and LCD to suit your taste.

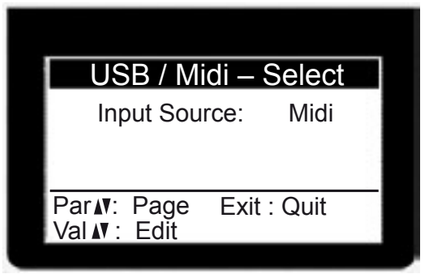


- LCD-Contrast: Controls LCD contrast. Factory setting is 10.
- LCD-Brightness: Controls LCD brightness in four steps (***MIN*** / ***Mid1*** / ***Mid2*** / ***Max***). Factory setting is Min.
- LED-Brightness: Controls LED brightness in two steps (***MIN*** / ***MAX***). Factory setting is Max.
- LED-Change: Enables color change of the LEDs. Factory setting is Off.
- Cursor left/right: Previous/next function
- Value up/down: Change value
- Exit: Quits Display / LED Settings page.

USB / MIDI - Select

Hit Parameter up/down keys to enter the fourth page of the Utility menu.

This function determines whether Schmidt will receive MIDI data through its USB port or through the MIDI DIN sockets.



- Value up/down: Toggles between "***MIDI***" and "***USB***". Factory default setting is MIDI.
- Exit: Quits USB / MIDI - Select page.

SYSTEM MENU

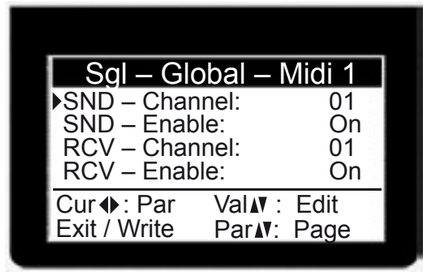
The System menu allows access to some global functions, mostly for communication with other instruments / computers, i. e. the configuration of Schmidt's MIDI interface, local control, and some more.

MIDI FUNCTIONS (FIVE PAGES)

The following menu comprises five pages. It enables/disables the various MIDI parameters Schmidt obeys to.

Hit the **Menu** key until the ***SYSTEM*** LED lights up. The LCD is now showing the following screen. If not, change the pages using the **Parameter up/down** keys.

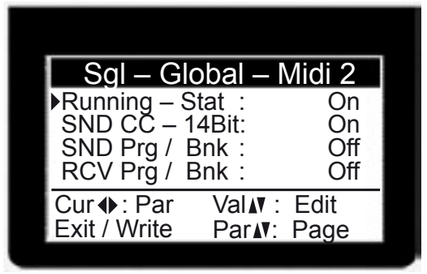
This is the first of currently five Single-Global-MIDI pages within the System menu. Select MIDI channel numbers (***1*** - ***16***) here for sending and receiving MIDI data (factory settings 1). You can also disable/enable sending/receiving all MIDI data (factory settings On).



- Cursor left/right: Previous/next parameter.
- Value up/down: Change value.
- Exit: Quits Edit Single-Global-MIDI 1 page.

Hit **Parameter up/down** keys to enter Single-Global-MIDI 2 page of the System menu.

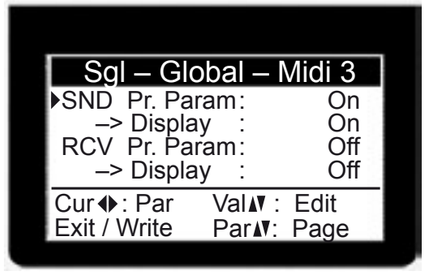
You will find the following functions here:



- Running Stat: Enables/disables MIDI running status. Running status is a help to limit the MIDI data stream. Factory setting is On.
- SND CC – 14 Bit: When enabled, Schmidt's controls transmit high-resolution MIDI controller data (14 bit). Factory setting is On.
- SND Prg/Bnk: Enables/disables the transmission of MIDI program change and/or bank change data.
  OFF: Transmission of MIDI program change and bank change disabled (factory setting).
  PRG: Transmission of MIDI program change data enabled, bank change disabled.
  P+B: Transmission of MIDI program change and bank change enabled.
- RCV Prg/Bnk: Enables/disables the reception of MIDI program and bank data. Available options are the same as above. Factory setting is Off.
- Cursor left/right: Previous/next parameter.
- Value up/down: Change value.
- Exit: Quits Edit Single-Global-MIDI 2 page.

Hit **Parameter up/down** keys to enter Single-Global-MIDI 3 page of the System menu.

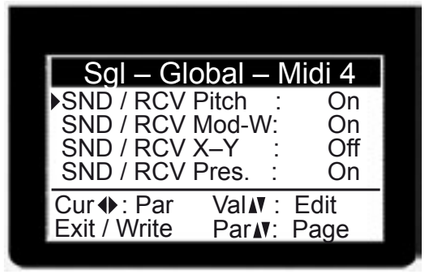
Here you will find the following set of functions:



- SND Pr. Param: Enables/disables Schmidt‘s panel control devices (control knobs, function keys) to transmit MIDI controller data. Factory setting is On.
- –> Display: When using a control or a function key, the LCD will display its name and edited value. Select between:
  - ***ON***: LCD always shows parameter name and edited value.
  - ***3S***: LCD shows parameter name and edited value for about three seconds before it returns to normal view (factory setting).
  - ***OFF***: LCD never shows parameter name and edited value.
- RCV Pr. Param: Enables/disables the reception of MIDI controller data to control Schmidt‘s panel control devices (control knobs, function keys) remotely via external MIDI devices. Factory setting is Off.
- –> Display: When receiving MIDI controller data, the LCD will display the controller number and current value. Select between:
  - ***ON***: LCD always shows controller number and current value.
  - ***3S***: LCD shows controller number and current value for about three seconds before it returns to normal view.
  - ***OFF***: LCD never shows controller number and current value (factory setting).
- Cursor left/right: Previous/next parameter.
- Value up/down: Change value.
- Exit: Quits Edit Single-Global-MIDI 3 page.

Hit **Parameter up/down keys** to enter Single-Global-MIDI 4 page of the System menu.

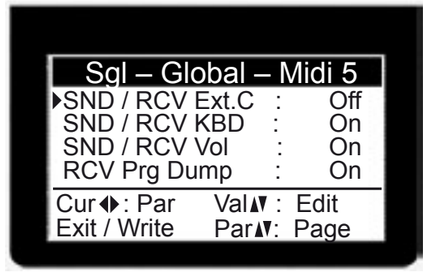
Here you will find the following set of functions:



- SND/RCV Pitch: Enables/disables the pitchwheel to send/receive MIDI controller data. Factory setting is Off.
- SND/RCV Mod-W: Enables/disables the modwheel to send/receive MIDI controller data. Factory setting is Off.
- SND/RCV X-Y: Enables/disables the stick controller to send/receive MIDI controller data. Factory setting is On.
- SND/RCV Pres.: Enables/disables keyboard pressure (aftertouch) to send/receive MIDI controller data. Factory setting is Off.
- Cursor left/right: Previous/next parameter.
- Value up/down: Change value.
- Exit: Quits Edit Single-Global-MIDI 4 page.

Hit **Parameter up/down** keys to enter Single-Global-MIDI 5 page of the System menu.

Here you will find the following set of functions:



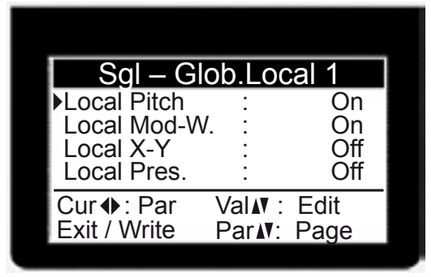
- SND/RCV Ext.C: When enabled, voltage values received through the external control inputs on Schmidt‘s rear panel will be transmitted as MIDI controller data. Factory setting is Off.
- SND/RCV KBD: Enables/disables Schmidt‘s keyboard to send/receive MIDI data. Factory setting is On.
- SND/RCV Vol: Enables/disables Schmidt‘s volume control to send/receive MIDI controller data (controller #7). Factory setting is On.
- RCV Prg Dump: Enables/disables the reception of MIDI preset dumps. Factory setting is On.
- Cursor left/right: Previous/next parameter.
- Value up/down: Change value.
- Exit: Quits Edit Single-Global-MIDI 5 page.

LOCAL ON/OFF MENU (TWO PAGES)

The following menu comprises two pages. It enables/disables the connection of the various controllers to Schmidt‘s internal sound generation engine. If disabled, the related controller is disconnected from the sound generation engine and transmits MIDI data only.

Hit **Parameter up/down** keys to enter Single-Global-Local 1 page of the System menu.

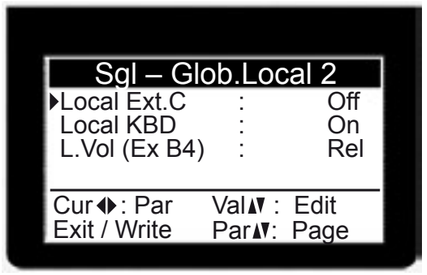
Here you will find the following set of functions:



- Local Pitch: Connects/disconnects the pitch wheel from Schmidt‘s sound generation. Factory setting is On.
- Local Mod-W.: Connects/disconnects the mod wheel from Schmidt‘s sound generation. Factory setting is On.
- Local X-Y: Connects/disconnects the stick controller from Schmidt‘s sound generation. Factory setting is Off.
- Local Pres.: Connects/disconnects the keyboard pressure (aftertouch) from Schmidt‘s sound generation. Factory setting is Off.
- Cursor left/right: Previous/next parameter.
- Value up/down: Change value.
- Exit: Quits Edit Single-Global-Local 1 page.

Hit **Parameter up/down** keys to enter Single-Global-Local 2 page of the System menu.

Here you will find the following set of functions:



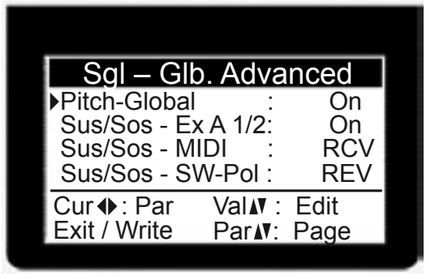
- Local Ext.C: Connects/disconnects the external control inputs on Schmidt‘s rear panel from Schmidt‘s sound generation engine. When disabled, control voltages received through the inputs have no effect on the sound generation but will be transmitted via MIDI. Factory setting is On.
- Local KBD: Connects/disconnects the keyboard from Schmidt‘s sound generation. Factory setting is Off.
- L.Vol (Ex B4): Determines the response of the volume (expression) pedal input (Ext In B 4).
  The following options are available:
  REL: The range of the connected expression pedal is limited by ”0” and the current setting of the Master Volume control (factory setting).
  ABS: The range of the connected expression pedal is limited by ”0” and the maximum level (equal to fully clockwise setting of Master Volume control).
  SGL: The range of the connected expression pedal is limited by ”0” and the volume setting of the current preset (equal to setting of Sound Volume control).
- Cursor left/right: Previous/next parameter.
- Value up/down: Change value.
- Exit: Quits Edit Single-Global-Local 2 page.

ADVANCED FUNCTIONS MENU (ONE PAGE)

The following menu currently has just one single page. Here, you will find some further setup functions that you use less frequently. The functions currently available determine the performance of the footswitches connected to the external inputs on Schmidt‘s rear panel.

Hit **Parameter up/down** keys to enter Single-Global-Advanced page of the System menu.

Here you will find the following set of functions:



- Pitch-Global: When active, the pitch bender will affect all of Schmidt‘s multi sound slots equally (factory default setting).
  When disabled, the pitch bender will affect each program individually, according to the value that has been programmed per program (you can assign a pitch bend range to a Single sound, remember? Please refer to page 57).

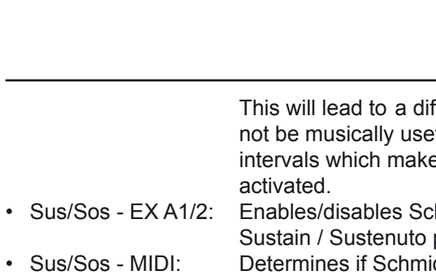
This will lead to a different bend range for each part of the Multi setup – which may or may not be musically useful. Imagine several individual pitch bends programmed at musical intervals which make your Multi patch spread out like a peacock‘s fan when pitch-bend is activated.

- Sus/Sos - EX A1/2: Enables/disables Schmidt‘s external control inputs EX A1/2. Both are used for connecting Sustain / Sustenuto pedals or foot switches. Factory setting is Off.
- Sus/Sos - MIDI: Determines if Schmidt processes Sustain / Sustenuto MIDI controller data.
  The following options are available:
  OFF: Schmidt will not send or receive sustain / sustenuto MIDI data (factory setting).
  RCV: Schmidt will receive sustain / sustenuto MIDI data.
  SND: Sustain / sustenuto information received at the external control inputs EX A1/2 will be transmitted as MIDI data.
  R+S: Receive and send functions are both enabled.
- Sus/Sos - SW-Pol: Toggles the polarity of a connected foot switch between the settings Standard (***STD***) or Reversed (***REV***). Factory setting is STD.
- Cursor left/right: Previous/next parameter.
- Value up/down: Change value.
- Exit: Quits Edit Single-Global-Advanced page.

RECEIVING SYSEX DATA

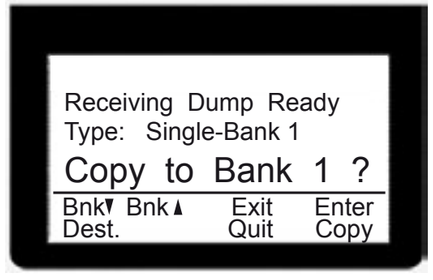
Schmidt is always ready to receive SysEx data, respectively Single preset banks and Multi preset banks. If Schmidt recognises incoming SysEx data, it temporarily saves them into a memory buffer and asks if and where the data should be saved permanently.
To receive Single preset banks, Schmidts Single mode has to be enabled. To receive Multi banks, Multi mode has to be enabled. Otherwise, the SysEx data will be ignored.

If Schmidt receives suitable SysEx data, the LCD shows:



Now the data is loaded into the memory buffer, shown by a progression bar. Cancel the reception by hitting **Exit**.

As soon as the data reception is complete, the screen shows:



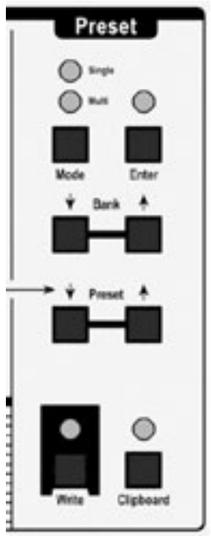
- Hit **Enter** to save the received preset bank to its current location.
- Use **Bank** up/down to select another target preset bank. Confirm with **Enter** key.
- Cancel the save process by hitting **Exit**.

Attention! Saving a received preset bank onto an existing bank overwrites the existing bank. Please note that there is no undo function!

SINGLE PRESET HANDLING

LOADING PRESET

You should already know how to load a Single Preset from Schmidt‘s memory. You will find all necessary controls in the Preset section, right beside the LCD:



1 - Hit **Mode** until the ***SINGLE*** LED lights up.
2 - Hit **Preset up/down** or turn **Value** control to step/scroll through the Single presets. The **LCD** (liquid crystal display, you remember?) shows bank number as well as preset number and name.
3 - Hit **Enter** to load the selected Single preset.

Hit **Quick Load** to enable the Quick Load option. Now you do not need to hit Enter anymore to load a selected preset.

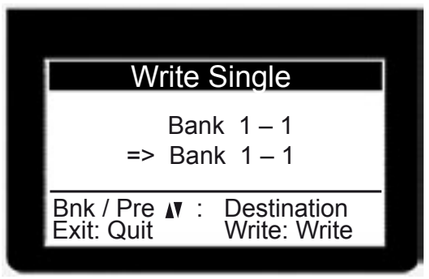
Hit **Bank** up/down to select the Single preset bank. The Quick Load option also works for bank selection.

Schmidt‘s on board memory holds 8 banks of 128 Single presets each.

SAVING SINGLE PRESETS

Do not forget to save your latest sound creation permanently. This section will show you how to store Single Presets.

Hit the **Write** key. The LCD reads:



The upper line shows the current preset location. Enter the destination of your preset in the line below.

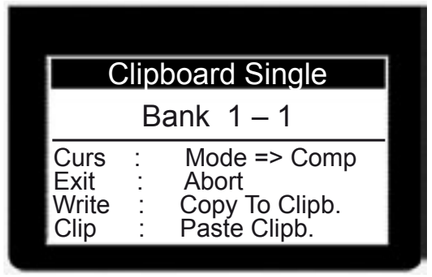
1 - Simply select the bank destination using the **Bank up/down** keys and the preset destination using the **Preset up/down** keys. You can also use the **Data entry dial**.
2 - Abort the write process by hitting **Exit**.
3 - Confirm the write process by hitting **Write** again. The display will briefly read ”***WRITE COMPLETE***” and returns to the preset load page.

To name your new preset, go to the first page of the Single Edit Menu which is described on page 66.

CLIPBOARD / COMPARE

The clipboard / compare function allows you to compare an edited preset with its original version. Also, you can put an edited version of a preset aside into a clipboard and recall or save it later.

Hit the **Clipboard** key to enter the clipboard function. The LCD reads:



Clipboard function

The Clipboard function is active by default.

- Curs: Use the Cursor to toggle between the ***Compare*** and ***Clipboard*** functions.
- Exit: Hit **Exit** to abort the clipboard/compare function. The LCD returns to the preset load menu.
- Write: Hit **Write** to copy your edited version of the current preset to the clipboard. It will be put aside there and left untouched while you can further edit the current preset or load (and tweak) other presets. The LCD returns to the usual „***Preset Load***“ screen.

Hit the **Clipboard** key again to return to the version stored in the clipboard section.

Store a presed from the clipboard:

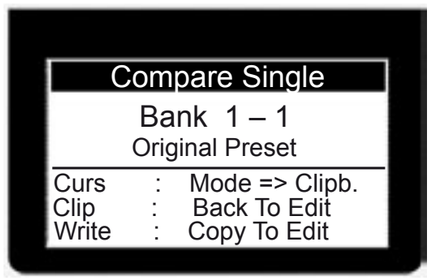
If you want to store the preset parked in the clipboard permanently, hit **Write** again. The LCD shows the already familiar Single Preset Write page (please see page 68).

Use the **Bank up/down** and **Preset up/down** keys to select a preset destination. Hit **Write** again to execute the store function. If you want to abort and quit, hit **Exit** key.

Compare function

When you are in clipboard mode, you have also access to a Compare function:

- Curs: Use the cursor again to toggle between the ***Compare*** and ***Clipboard*** functions. When the ***Compare*** function is active, the LCD looks like this:



- Clip: Toggles between original preset and edited version.
- Write: Discard the edited version by overwriting it with the original preset version.

V.

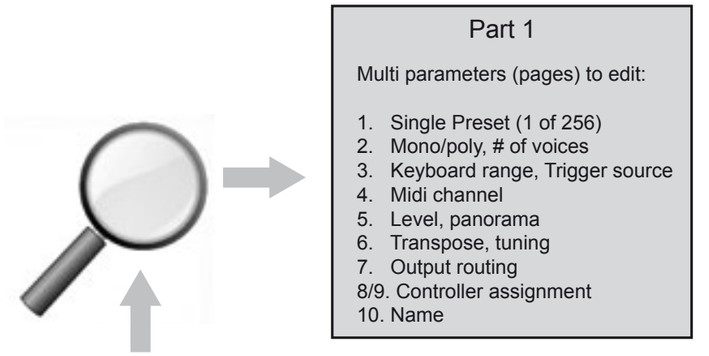
MULTIMODE

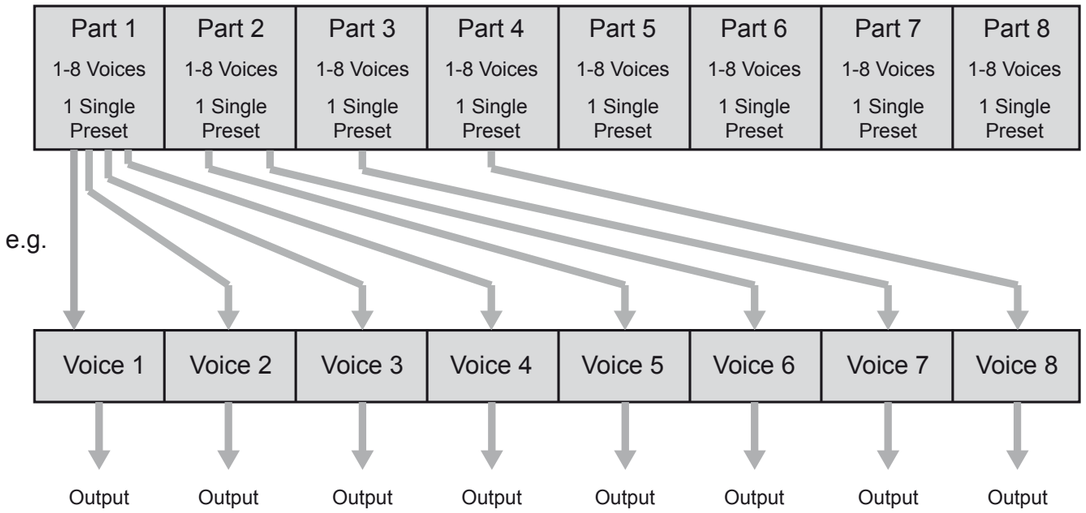
MULTIMODE

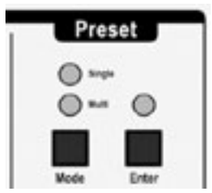
Schmidt provides a multi mode with up to eight different parts playing simultaneously. A part contains one single preset and various settings which determine its performance within the multi preset.
Each part can consist of one to eight voices. The voice allocation is either fixed or has to be programmed manually for each multi preset respectively. As you may have figured out already, using e.g. one part with two voices and another with six voices reduces the available number of multimode parts to two. In any case, the number of eight voices cannot be exceeded.

As well as the single presets, a multi preset can be stored in a memory space of eight banks with 32 presets each.

The following figure shows the schematic diagram of the multi mode. In this example, Part 1 uses voices #1 to #4, Part 2 uses voice #5 and #6 while Part 3 uses voice #7 and Part 4 voice #8. Each part features an identical set of parameters that can be edited in Multi Edit mode. It is illustrated for Part 1 here and will be described in detail below.

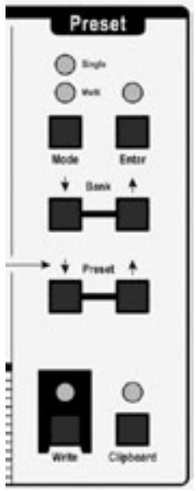






To enter Multi Mode, simply hit the **Multi** key in the Preset section of the front panel until the ***MULTI*** LED lights up.

LOADING MULTI PRESETS:



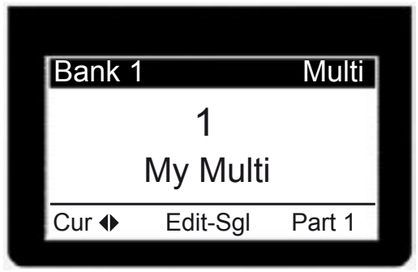
1 - Hit **Preset up/down** or turn **Value dial** to scroll through the Multi presets.
2 - Hit **Enter** to load the selected Multi preset.

Hit **Quick Load** to enable Quick Load option. Now you do not need to hit Enter anymore to load the selected preset.

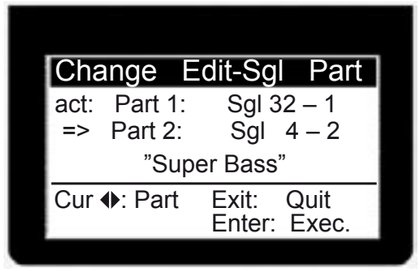
Hit **Bank up/down** to select the Multi preset bank. The Quick Load option also works for bank selection.

Schmidt's on-board memory holds 8 banks of 32 Multi presets each.

You can select a Single preset of one Multi Part and put it on Schmidt's front panel to edit its sound without leaving the multi mode. As soon as you loaded a multi preset, the LCD reads:



Hit the **Cursor** to select the part that should be assigned to the front panel for editing. The LCD reads:



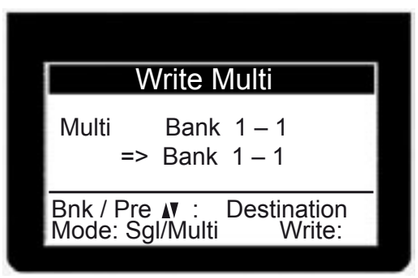
Use **Enter** to execute the function. Use **Exit** to cancel thefunction.

SAVING MULTI PRESETS

Do not forget to save your latest Multi Preset permanently. This section will show you how to store Multi Presets.

Enter the ***Preset Load*** menu by hitting the **Menu** key.

Hit the **Write** key. The LCD reads:



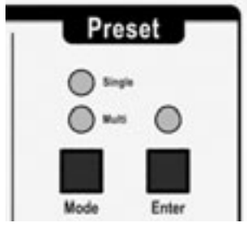
The upper line shows the current preset location. Enter the desired destination of your preset in the line below.

1 - Simply select the bank destination using the **Bank up/down** keys and the preset destination using the **Preset up/down** keys. You can also use the **Data entry dial**.
2 - Abort the write process by hitting **Exit**.
3 - Confirm the write process by hitting **Write** again. The display will briefly read "***WRITE COMPLETE***" and returns to the preset load page.

To name your new preset, go to the last page of the Edit Multi Menu which is described on page 86.

As you just learned, you can edit sounds that are used in the current multi preset without leaving the multi mode. You simply have to assign them to Schmidts front panel. Thus you can also save such an edited sound right from the multi mode.

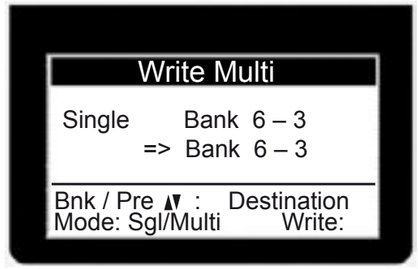
Please keep in mind, that in multi mode just the links to the related single presets are saved, not the no sound settings (single presets) itself. If you edit a single preset in multi mode, you have to save its settings separately:



Hit the **Mode** key. The ***Single*** LED lights up

and

the LCD shows the following screen:



Please note that multi mode is still enabled. Now you can save the edited single preset to the current location or any other location if desired.

- Hit **Exit** to cancel the write process and revert to the multi mode screen.
- Hit **Write** to perform the write process. The LCD asks "Write Single Are you sure?"
- Hit **Write** again to conform and execute the write process.
- Hit **Exit** to cancel the write process.

When the write process is completed, the LCD reverts to the multi mode screen.

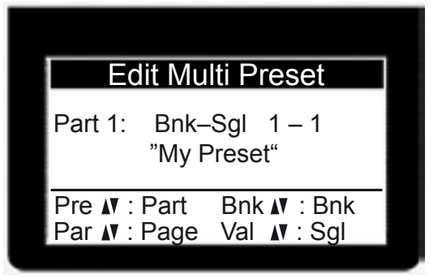
SETTING UP MULTI PRESETS

To setup a multi preset you will find ten pages in the Multimode Menu (please refer to the figure on page 77. Each page provides a set of functions to define the properties of the Multi Preset.

Hit the **Menu** key until the Preset Edit LED lights up. If necessary, scroll through the Multimode pages by hitting the **Parameter up/down** keys. The first of the ten Multi preset edit menus reads like this:

1. Assign Preset sounds

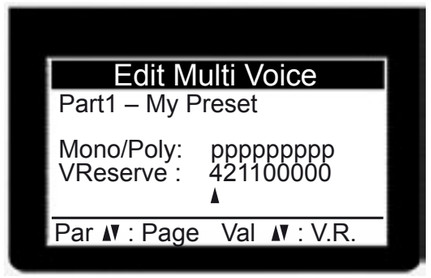
Hit **Parameter up/down** keys to enter the Edit Multi Voices page. On this page you can select Multi parts and load single presets into each of them. The LCD reads like this:



- Pre: Hit the **Preset up/down** keys to select the desired Part (***1*** - ***8***).
- Bnk: Hit the **Bank up/down** keys to select the desired single preset bank (***1*** - ***8***).
- Val: Hit the **Value up/down** keys to select the desired single preset (1 - ***256***).
  You can also use the **data entry** control.

2. Assign voices

Hit **Parameter up/down** keys to enter the Edit Multi Voices page. Here you can assign voices to the Multi parts.
The LCD shows this screen:

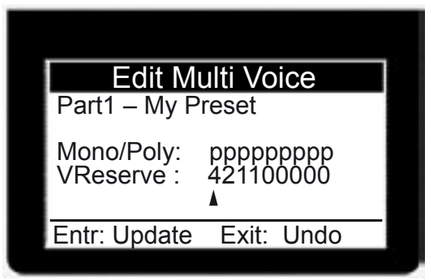


- The upper line shows the selected part and the associated preset.
- The second line informs you whether the eight slots use polyphonic (”***P***“) or monophonic (”***M***“) single presets.
  Please refer to page 54, section „Glide / Bend“, „Voice Allocation“.
- The third line shows the maximum number of voices that can be played by the associated Part (”***Voice Reserve***“).

*A single preset with unison setting becomes automatically monophonic (”**M**“) when used in multi mode. If you assign two or more voices, it returns back to unison i.e. the assigned number of voices playable on one key. The detuning function can be found in multi mode menu page 6 ”Tune Parts“ (see page 82).*

- Use the **Cursor up/down** keys to select the parts.
- Use the **Value up/down** keys to select the maximum number of voices for each part („***V.R.***“ = „Voice Reserve“).

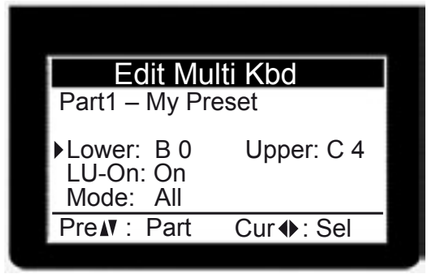
If anything has been edited, the screen will change to this message:



Hit **Enter** to confirm the changes or cancel the changes by hitting **Exit**. In either case, the screen will return to its original state. Now you can select the next page.

3. Keyboard Mapping

Hit **Parameter up/down** keys to enter the Edit Multi Keyboard page. Here, you can create a keyboard mapping for each Multi part.

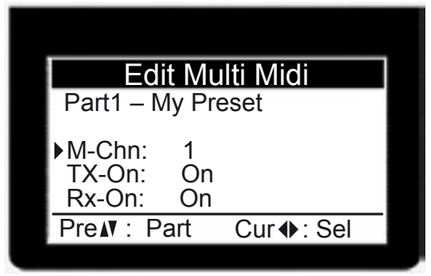


Use the **Cursor** up/down keys to select a parameter.
Use the **Value** up/down keys or the **data entry** control to alter the values.

- Lower: Lowest note of the keyboard zone (available ***C-1*** to ***G9***).
- Upper: Highest note of the keyboard zone (available ***C-1*** to ***G9***).
- LU-On: Enables/disables the Lower/Upper settings i.e. if set to ***OFF***, the part uses the entire keyboard range. If set to ***ON***, the settings above are enabled.
- Mode: Determines whether the selected part responds to the internal keyboard (”***KBD***“), to MIDI data (”***MIDI***“) or both (”***ALL***“).

4. MIDI Settings

Hit **Parameter up/down** keys to enter the Edit Multi MIDI page. Please use this page to create a simple individual MIDI setup for each multi part.



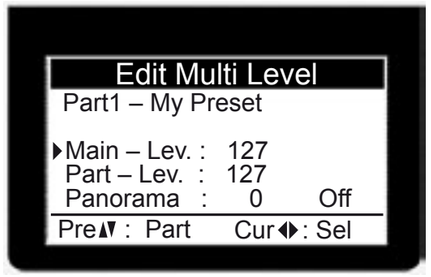
Use the **Cursor** up/down keys to select a parameter.
Use the **Value** up/down keys or the **data entry** control to alter the values.

- M-Chn: Select the MIDI channel of the current Multi part (***1*** to ***16***).
- TX-On: Determines whether the Multi part currently active transmits MIDI data or not.
- RX-On: Determines whether the Multi part currently active receives MIDI data or not.

Please note: TX/RX settings refer to the entire MIDI data transfer of the corresponding multi part. Individual MIDI controllers can be enabled/disabled on MIDI Controller Setup (Multi menu pages 8 / 9). Please refer to page 83.

5. Part Levels

Hit **Parameter up/down** keys to enter the Edit Multi Level page. This page works like a simple mixer for all Multi parts. You can set a master level for the Multi preset and determine different levels as well as individual panorama settings for each part.

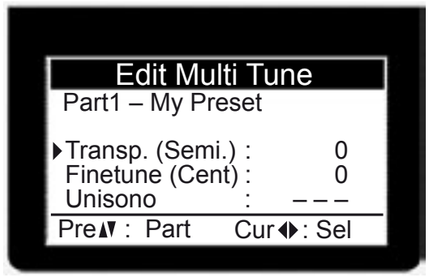


Use the **Cursor up/down** keys to select a parameter.
Use the **Value up/down** keys or the **data entry** control to alter the values.

- Main-Lev: Determines the maximum output level of the Multi preset (***0*** to ***127***).
- Part-Lev: Determines the maximum output level of the current part (***0*** to ***127***).
- Panorama On/Off: Determines whether the panorama setting as well as the panorama LFO modulation settings of the single preset will be used in the Multi part (”***OFF***“).
  If set to ”***ON***“, the single preset settings are ignored and the value of the following parameter is used instead.
- Panorama: Sets the current part to a panorama position (***L63*** to ***0*** to ***R63*** – no panorama modulation).

6. Tune Parts

Hit **Parameter up/down** keys to enter the Edit Multi Tune page.
Here you can transpose and fine-tune the Multi parts individually.



Use the **Cursor up/down** keys to select a parameter.
Use the **Value up/down** keys or the **data entry** control to alter the values.

- Transp. (Semi.): Transposes the part by up to +/– 48 semitones.
- Finetune (Cent): Fine-tunes / detunes the part by up to +/– 50 cents.
- Unison: - If the current part uses a monophonic preset (”***M***“) with 2 or more voices the part is played unisono and you can detune its voices.

  - If the current part uses a preset with unison mode active, you can assign and detune its voices independent of the single preset setting. Please refer to multi mode page 2 „Assign Voices“ on page 82.

  The value goes from ***0*** to ***100*** cent.
  If the single preset currently used by this part is not unison, the parameter is not available and the LCD reads ”**– – –**“.

7. Multi Mix Page

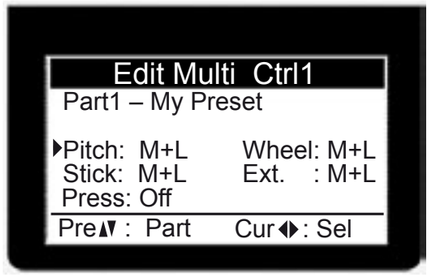
Hit **Parameter up/down** keys to enter the Edit Multi Mix page. On this page you can determine whether the voice(s) used by the eight parts are cancelled from the summing (master) output.

Use the **Cursor** to select the desired part.
Use the **Value up/down** keys to alter the setting.

- If set to ”***X***“, the corresponding part sends its voice(s) through the Master out.
- If set to ***”–“,*** the corresponding voice(s) are cancelled from the Master out.

8. / 9. MIDI Controller Setup (two pages)

Hit **Parameter up/down** keys to enter the Edit Multi Controller 1 page.
The following page determines whether the Multi parts obey to Schmidt‘s real time controls (modwheel, aftertouch etc.) or the incoming MIDI controller data respectively.
Use the **Cursor up/down** keys to select a parameter.

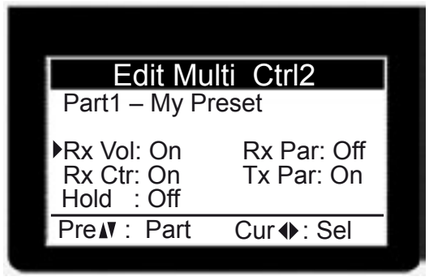


Use the **Value up/down** keys to alter the values.

- Pitch: Pitchwheel. Available options are:
  - ***M+L***: The current part processes pitchwheel data from incoming MIDI as well as from Schmidt‘s local pitchwheel.
  - ***MIDI***: The current part processes pitchwheel data from incoming MIDI.
  - ***LOC***: The current part processes pitchwheel data from Schmidt‘s local pitchwheel.
  - ***OFF***: The current part will not process any pitchwheel data.
- Wheel: Modulation Wheel. The available options are the same as with the pitchwheel.
- Stick: Stick controller. The available options are the same as above.
- Ext.: External controller inputs. The available options are the same as above.
- Press: Keyboard pressure. The available options are the same as above.

Hit **Parameter up/down** keys to enter the Edit Multi Controller 2 page.

Here you can enable / disable further MIDI controller communication for the Multi parts.
Use the **Cursor up/down** keys to select a parameter.

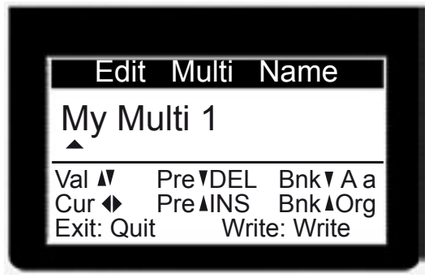


Use the **Value up/down** keys to alter the values.

- Rx Vol: Enables / disables the reception of MIDI volume controller (ctrl #7) for the selected Multi part.
- Rx Ctr: Enables / disables the reception of all MIDI controller data for the selected Multi part.
- Rx Par: Enables / disables the reception of Schmidt's parameter values (MIDI controller data) for the selected Multi part.
- Tx Par: Enables / disables the transmission of Schmidt's parameter values (MIDI controller data) for the selected Multi part.
- Hold: Determines the reception of MIDI hold pedal controller (ctrl #64 and #66) for the selected Multi part. Available options are:
  - ***M+L***: The current part processes hold pedal controller from incoming MIDI as well as from Schmidt's local External Input.
  - ***MIDI***: The current part processes hold pedal controller from incoming MIDI.
  - ***LOC***: The current part processes hold pedal controller from Schmidt's local External Input.
  - ***OFF***: The current part will not process any hold pedal controller data at all.

10. Naming a Multi Preset

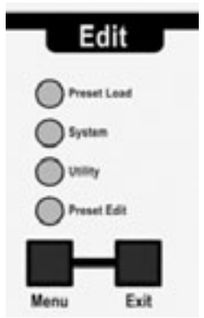
Hit **Parameter up/down** keys to enter the Edit Multi Name page.
Here you can name your new Multi preset by using the following functions:



- Value up/down: Change character
- Cursor left/right: Previous/next character
- Preset down: Delete character
- Preset up: Insert character
- Bank down: Toggle between capitals and small letters
- Bank up: Reloads the previous name.
- Exit: Quits Edit Single Name page
- Write: Saves settings to current preset

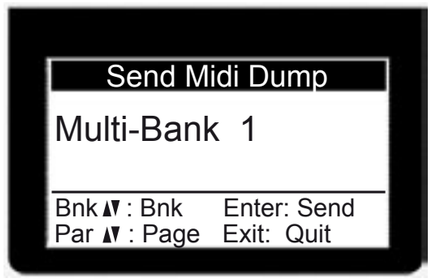
MULTI UTILITY MENU

There is also a utility menu for the Multi mode. It currently comprises one page only that provides a function to transmit Multi preset banks via MIDI dump.



Select ***Utility*** with the **Menu** key while in Multi mode.

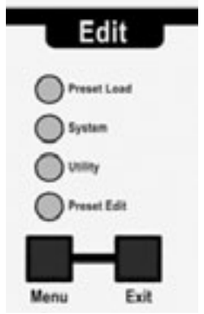
The LCD reads like this:



- Bank up/down: Selects Multi Preset bank (***1*** – ***8***) to be transmitted.
- Enter: Performs MIDI dump.
- Exit: Quits Send MIDI dump page.

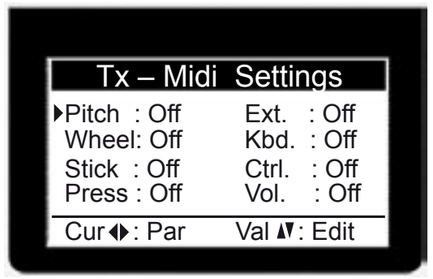
MULTI SYSTEM MENU

You will also find a system menu for the Multi mode. It currently has only one single page with some parameters that enable / disable the transmission of performance controller MIDI data in Multi mode on a global level (in contrast to the Edit Multi Controller 1 page, that deals with individual settings per Multi part).



Hit the **System** key while in Multi mode.

The LCD reads like this:



Use the **Cursor** to select one of the following parameters:
Use the **Value up/down** keys to enable / disable the selected function.

- Pitch: Pitchwheel
- Wheel: Modwheel
- Stick: Stick controller
- Press: Keyboard pressure
- Ext.: External Inputs
- Kbd: Keyboard (note on/off)
- Ctrl.: Controller (controller data generated by Schmidt‘s front panel).
- Vol.: Volume (controller #7 data generated by Schmidt‘s Volume control).

FIRMWARE UPDATE

It is quite easy to update Schmidts firmware via SysEx data dump. Please check out the EMC website frequently (www.emc-de.com). We will announce new versions there.

Please download the firmware files from the EMC website and unzip the data. Schmidts firmware consists of three different files. You will find:

- VX.XX_voice.syx (Voice boards)
- VX.XX_system.syx (System)
- VX.XX_panel.syx (Panel boards)

The file names show the software version (e.g. V1.10), the function (e.g. system) and the data type (Sytem Exclusive).

To transfer the data to Schmidt, we recomend a freeware MIDI dump software just like SysEx Librarian.app (for Mac OSX). Get it on www.snoize.com/SysExLibrarian/
or
MIDIOX for Windows. Get it on www.midiox.com

This is how to perform the update procedure (the LCD will also guide you through the entire procedure):

1 - Enable firmware download mode:
- a) Power Schmidt down.
- b) Keep **Clipboard** and **Preset** keys pressed down simultanously while powering up Schmidt.
- => A blue screen appears (no – this is not a crash...) and shows the OS menu.
- c) Select ”***Software Update***“ and hit **Enter** key.

2 - Transfer Voice OS data:
- a) Select ”***Update Voices***“ with the **Cursor** and hit **Enter**.
- b) Upload the file ”VX.XX_voice.syx“ to Schmidts MIDI In socket.
- => As soon as the upload is complete, an automatic check up is performed.
- c) Hit **Enter** key (OK).
- d) Confirm with **Enter** key.
- e) Hit **Exit** to quit the funtion.

3 - Transfer System OS data:
- a) Select ”***Update System***“ with the **Cursor** and hit **Enter**.
- b) Upload the file ”VX.XX_system.syx“ to Schmidts MIDI In socket.
- => As soon as the upload is complete, an automatic check up is performed.
- c) Hit **Enter** key (OK).
- d) Confirm with **Enter** key.
- e) Hit **Exit** to quit the funtion.

4 - Transfer Panel OS data:
- a) Select ”***Update Panel***“ with the **Cursor** and hit **Enter**.
- b) Upload the file ”VX.XX_panel.syx“ to Schmidts MIDI In socket.
- => As soon as the upload is complete, an automatic check up is performed.
- c) Hit **Enter** key (OK).
- d) Confirm with **Enter** key.
- e) Hit **Exit** to quit the funtion.

5 - Complete firmware update.
- a) Power Schmidt down.
- b) Wait for about five seconds and power up Schmidt.

If an Error message shows up on the LCD, please do not panic. Simply repeat the entire procedure once again.

Attention: - Never, never (!) power down Schmidt while the update process is performed!
- Always keep to this order above resp. the instructions on the LCD.

VI.

APPENDIX

APPENDIX

MIDI IMPLEMENTATION

MIDI CONTROLLER ASSIGNMENTS

CC #			
Parameter	Send/Receive	Explanation	Comment
0/32	S/R	Bank-Select MSB/LSB	Single/Multi: MSB=0 LSB=0 7
1/33	S/R	Mod-Wheel MSB/LSB	LSB only sent when Snd-CC14Bit: On
6/38	S/R	Data-Entry MSB/LSB	See NRPN
7/39	S/R	Volume MSB/LSB	LSB only sent when Snd-CC14Bit: On
64	S/R	Sustain	
66	S/R	Sostenuto	
98	S/R	NRPN-Nummer LSB	See NRPN
99	S/R	NRPN-Nummer MSB	See NRPN
102	S/R	Joystick X-Position	0 127
103	S/R	Joystick Y-Position	0 127
104	S/R	Pedal Ext1	0 127
105	S/R	Pedal Ext2	0 127
106	S/R	Pedal Ext3	0 127
107	R	LED-Color	0 63
108	R	Display-Color	0 63
109	R	LED+Display-Color	0 63
121	R	Reset Controller	Single-Mode only
122	R	Local Control	
123	R	All Notes Off	

Please note:

NRPN:

Used to send/receive the parameters of a sound. All parameters have the following in common:

1. NRPN #		MSB (CC#99)
2. NRPN #		LSB (CC#98)
3. Data entry	(Ctrl. Value)	MSB (CC#38)
4. Data entry	(Ctrl. Value)	LSB (CC#6)

Send:
When editing a new parameter, the NRPN # will always be transmitted. When editing the same parameter twice, only the data entries (controller values) will be transmitted.

Receive:
When receiving controller data, all data entries (controller values) will refer to the last NRPN # received, as long as no new NRPN # is received. When NRPN = 127-MSB + 127-LSB is received, subsequent data entries (controller values) will be ignored.

MIDI MESSAGES

OSZ 123

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
PWM Settings	154	S/R	Switch	LMKKMVXR	L: Max Limit On/Off (1/0) MM: LFO-Mode: 01 (One-Shot) MM: LFO-Mode: 00 (Triangle) MM: LFO-Mode: 10 (Sine) KK: Kbd Scale: 00 (Off) KK: Kbd Scale: 10 (1/4) KK: Kbd Scale: 11 (1/2) V: Vel-LFO-Depth On/Off (1/0)

OSZ 1234

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Vibrato Assign	222	S/R	Switch	1XXXXXXX	Assign to Osz1234 Off
				0XXXXXXX	Assign to Osz1234 On
Envelope Assign	223	S/R	Switch	1XXXXXXX	Assign to Osz1234 Off
				0XXXXXXX	Assign to Osz1234 On
Unisono Tune (Mono)	72	S/R	M	0… 255	
Single Fine Tune	73	S/R	M	0… 128… 255	(-50Cent… 0… +50Cent)
Single Transpose	74	S/R	M	244… 255	(-12HT… -1HT)
				0… 12	(0… +12HT)

OSZ 1

Parameter	NRPN#	Send/Receive	Send/Receive	Data Format	Explanation
Vibrato Wave	206	S/R	Switch	0	Sine
				1	Square
				2	Random
				3	Sine/Random
Vibrato Depth	198	S/R	Pot	0...255	
Vibrato Rate	202	S/R	Pot	0… 255	0,1Hz… 75Hz 0,2Hz… 150Hz (Wave:Random)
Env Destination/Mode	218	S/R	Switch	DDXXQMVM	Q: Quant On/Off (1/0) V: Vel On/Off (1/0) DD: Dest: 00 (Pitch) DD: Dest: 10 (Vib.Depth) DD: Dest: 11 (Noise Depth) MM: Mode: 00 (Decay Exp) MM: Mode: 10 (Decay Lin) MM: Mode: 01 (Attack/Decay)
Envelope Depth	210	S/R	Pot	0… 255	(-15HT… +15HT)
Envelope Time	214	S/R	Pot	0… 255	12ms… 6,1S (Decay Lin/Exp) 7,5ms… 3,8S (Attack/Decay)
Noise Modulation	152	S/R	Pot	0...255	
Detune	149	S/R	Pot	0...255	fine on: (-15...+15Cent) fine off: (-75...+75Cent)
Semitone	153	S/R	Pot	2,4,6,8… 30	(-7HT… +7HT)
Detune Fine/KBD Scale/Wave	150	S/R	Switch	KKFXXWWW	KK: Kbd Scale: 00 (Off) KK: Kbd Scale: 10 (1/4) KK: Kbd Scale: 11 (1/2) F: Fine On/Off: (0/1) WWW: Wave: 001 (Square) WWW: Wave: 010 (PW) WWW: Wave: 101 (Saw) WWW: Wave: 111 (Saw/PW) WWW: Wave: 100 (Multi PWM) WWW: Wave: 110 (Multi/PW)
Octave/Sub Octave	151	S/R	Switch	XSSSXXOO	SSS: Sub-Oct: 000 (Off) SSS: Sub-Oct: 001 (64") SSS: Sub-Oct: 010 (32") SSS: Sub-Oct: 011 (16") SSS: Sub-Oct: 100 (8") OO: Octave: 00 (32") OO: Octave: 01 (16") OO: Octave: 10 (8")
Multi PWM Diffuse/Mode	170	S/R	Switch	XXXDDXMM	DD: LFO Diffuse: 00 (Off) DD: LFO Diffuse: 10 (Slow) DD: LFO Diffuse: 11 (Fast) MM: Mode: 00 (1) MM: Mode: 01 (2) MM: Mode: 10 (3) MM: Mode: 11 (Osz1 + PW)

Multi PWM LFO Vel/Mode/Kbd	171	S/R	Switch	KKKMMMWS	KKK: Kbd Scale: 000 (Off) KKK: Kbd Scale: 110 (1/4) KKK: Kbd Scale: 111 (1/2) MMM: Mode: 001 (Decay) MMM: Mode: 101 (Attack/Deacy) MMM: Mode: 000 (LFO) MMM: Mode: 010 (Step) W: Width-LFO-Vel On/Off: (1/0)
Multi PWM Width Center	164	S/R	Pot	0..255	
Multi PWM Width Lfo Depth	167	S/R	Pot	0..255	(-Max… Off… +Max)
Multi PWM Width LFO Rate	166	S/R	Pot	0..255	0,025Hz… 20Hz
Multi PWM Space Center	165	S/R	Pot	0..255	
Multi PWM Space LFO Depth	169	S/R	Pot	0..255	(-Max… Off… +Max)

VCF 1/2 DF1/2

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
LFO Source	100	S/R	Switch	DDCCBBAA	DD: 11: DF2-LFO-Sorce: LFO-DF1 DD: 10: DF2-LFO-Sorce: LFO-VCF1 DD: 01: DF2-LFO-Sorce: LFO-DF2 CC: 11: DF1-LFO-Sorce: LFO-VCF2 CC: 10: DF1-LFO-Sorce: LFO-VCF1 CC: 00: DF1-LFO-Sorce: LFO-DF1 BB: 00: VCF1-LFO-Sorce: LFO-VCF1 BB: 01: VCF1-LFO-Sorce: LFO-VCF2 BB: 11: VCF1-LFO-Sorce: LFO-VCF1+2 AA: 01: VCF2-LFO-Sorce: LFO-VCF1 AA: 00: VCF2-LFO-Sorce: LFO-VCF2

VCF 1/2

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Input Source	79	S/R	Switch	DDBCCBAA	AA: VCF1 Input A BB: VCF1 Input B CC: VCF2 Input A DD: VCF2 Input B AA/BB/CC/DD: 10: Osz1 01: Osz2 11: Osz2
Input B Filter/Level Mod	81	S/R	Switch/M	ABCDFFMM	A: VCF2-Filter Mod On/Off (1/0) B: VCF1-Filter Mod On/Off (1/0) AB Edited in Preset Menu C: VCF2-Lev.Mod Vel. On/Off (1/0) D: VCF1-Lev.Mod Vel. On/Off (1/0) FF: 00: VCF2-Lev.Mod ENV-Off FF: 10: VCF2-Lev.Mod ENV-Attack FF: 01: VCF2-Lev.Mod ENV-Decay FF: 11: VCF2-Lev.Mod ENV-LFO MM: 00: VCF1-Lev.Mod ENV-Off MM: 10: VCF1-Lev.Mod ENV-Attack MM: 01: VCF1-Lev.Mod ENV-Decay
VCF12 Decay2 On/Off	61	S/R	Switch	BAXXXXXX	B: VCF1 Decay2 On/Off (1/0) A: VCF2 Decay2 On/Off (1/0)
VCF12 LFO-Sync-Mode	31	S/R	M	BBBBAAAA	BBBB: VCF2-Sync Mode AAAA: VCF1-Sync Mode 0000 : Intern (LFO Time Pot.) 0001: Midi-Clock /32 0010: Midi-Clock /16 0011: Midi-Clock /16. 0100: Midi-Clock /8 0101: Midi-Clock /8. 0110: Midi-Clock /4 0111: Midi-Clock /4. 1000: Midi-Clock /2 1001: Midi-Clock /2. 1010: Midi-Clock /1 1011: Midi-Clock /1. 1100: Midi-Clock *2

DF1/2

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Input Source	80	S/R	Switch	DDCCBBAA	AA: DF1 Input A BB: DF1 Input B CC: DF2 Input A DD: DF2 Input B AA/BB/CC/DD: 00: Osz1 01: Osz2 10: Osz2
Resonance	131	S/R	Switch	XXBBBAAA	BBB: Reso-DF2 000..111 -> Min Max AAA: Reso-DF1 000..111 -> Min Max
ENV-Mode/DF1->2 Assign	130	S/R	Switch	XXXXXCBA	C: Assign DF1->DF2 Settings On/Off (1, B: ENV-Mode DF2 0:ENV 1:Ramp A: ENV-Mode DF1 0:ENV 1:Ramp

Group12 Out Mix + Group12 In

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Input/output	109	S/R	Switch	GFEDCCBA	G: Input DF2-Mix A+B On/Off (1/0) F: Input DF1-Mix A+B On/Off (1/0) E: VCF2 Out-Invert On/Off (1/0) D: VCF2 Out On/Off (0/1) CC: 00: VCF3-Input : Osz1 CC: 01: VCF3-Input : Osz2 CC: 10: VCF3-Input : Osz3 CC: 11: VCF3-Input : Osz4 B: VCF1 Out-Invert On/Off (1/0)
VCF3 Group1/2 Out	110	S/R	Switch	BAXXXXX1	B: Group2 VCF3-On/Off (1/0) A: Group1 VCF3-On/Off (1/0)
DF1/2 Group1/2 Out	114	S/R	Switch	XXFEDCBA	F: Group2 DF2 Dist-Vel. On/Off (1/0) E: Group1 DF1 Dist-Vel. On/Off (1/0) D: Group2 DF2 Invert On/Off (1/0) C: Group1 DF1 Invert On/Off (1/0) B: Group2 DF2-Out On/Off (1/0)
Group1 Velocity	38	S/R	Pot	0 128 255	(-Max Off +Max)
Group2 Velocity	39	S/R	Pot	0 128 255	(-Max Off +Max)
Group1 Out DF1 Distortion	115	S/R	Pot	0 255	
Group2 Out DF2 Distortion	116	S/R	Pot	0 255	
Group1 Out DF1 Level	98	S/R	Pot	0 255	
Group2 Out DF2 Level	99	S/R	Pot	0 255	
Group1 Out VCF3 Level	111	S/R	Pot	0 255	
Group2 Out VCF3 Level	112	S/R	Pot	0 255	
VCF3 Cutoff	113	S/R	Pot	0 255	

Group 1/2 Level Mod

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Mix Man/Fade-Controls	48	S/R	Switch	XXFFMSXX	FF: 01: Fade-Mode: 2->1 FF: 11: Fade-Mode: 2->1->2 FF: 10: Fade-Mode: 2->Min->2 FF: 00: Fade-Mode: 2->Min M: Mix-Mode: Man/Fade (1/0)
Group1/2 Man-Mix	49	S/R	Pot	0 255	Group1 Group2
Group1/2 Fade-Time	50	S/R	Pot	0 255	5ms 4S (Fade-Mode 2->1,2->Min) 10ms 8S (Fade-Mode 2->1->2) 10ms 8S (Fade-Mode 2->Min->2)
Group1/2 Fade-Delay	51	S/R	Pot	0 255	0 4,5S
LFO-Controls	57	S/R	Switch	DDDRVXXX	DDD: 000: Group-Dest: Off DDD: 100: Group-Dest: 1 DDD: 010: Group-Dest: 2 DDD: 110: Group-Dest: 1+2 DDD: 111: Group-Dest: 1+ 2- R: LFO-Note-Reset On/Off (1/0)
Mix-LFO-Depth	58	S/R	Pot	0 255	
Mix-LFO-Rate	59	S/R	Pot	0 255	0 4,5S

Panorama-Controls	52	S/R	Switch	SDDVMMXD	S: Voice-Spread On/Off (1/0) DDD: 000: Group-Dest: Off DDD: 001: Group-Dest: 1 DDD: 010: Group-Dest: 2 DDD: 011: Group-Dest: 1+2 DDD: 111: Group-Dest: 1+ 2- V: LFO-Depth-Velocity On/Off (1/0) MM: 01: LFO-Mode: L>R MM: 10: LFO-Mode: L>R>L
Panorama-LFO-Depth	55	S/R	Pot	0 255	
Panorama-LFO-Rate	56	S/R	Pot	0 255	0,025Hz 10Hz (LFO-Continuous) 20S 40ms (LFO-Mode: L>R) 40S 80ms (LFO-Mode: L>R>L)
Group1 Pan-Offset	53	S/R	Pot	0 255	Left Rigth
Group2 Pan-Offset	54	S/R	Pot	0 255	Left Rigth

Master ENV/VCA-VCF12 Retrigg

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Soft/VCA-VCF12-Retrigg	60	S/R	Switch	XXXXDCBA	D: VCF1-Retrigg On/Off (1/0) C: VCF2-Retrigg On/Off (1/0) B: VCA-Soft On/Off (1/0) A: VCA-Retrigg On/Off (1/0)
Sound Volume	32	S/R	Pot	0 255	
Attack	33	S/R	Pot	0 255	1ms 10ms
Decay	34	S/R	Pot	0 255	2ms 20S
Sustain	35	S/R	Pot	0 255	
Release	36	S/R	Pot	0 255	2ms 20S
Release-Level	37	S/R	Pot	0 255	

Glide/Bend

Parameter	NRPN#	Send/Receive	Send/Receive	Data Format	Explanation
Pitch Bend	148	S/R	Pot	0,1,2	(-12HT)
				3 13	(-11HT -1HT)
				14	Off
				1 28	(+1 +11HT)
				29,30,31	(+12HT)

NRPN CONTROLLER

OSZ 123

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
PWM Settings	154	S/R	Switch	LMKKMVXR	L: Max Limit On/Off (1/0) MM: LFO-Mode: 01 (One-Shot) MM: LFO-Mode: 00 (Triangle) MM: LFO-Mode: 10 (Sine) KK: Kbd Scale: 00 (Off) KK: Kbd Scale: 10 (1/4) KK: Kbd Scale: 11 (1/2) V: Vel-LFO-Depth On/Off (1/0)

OSZ 1234

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Vibrato Assign	222	S/R	Switch	1XXXXXXX	Assign to Osz1234 Off
				0XXXXXXX	Assign to Osz1234 On
Envelope Assign	223	S/R	Switch	1XXXXXXX	Assign to Osz1234 Off
				0XXXXXXX	Assign to Osz1234 On
Unisono Tune (Mono)	72	S/R	M	0 255	
Single Fine Tune	73	S/R	M	0 128 255	(-50Cent 0 +50Cent)
Single Transpose	74	S/R	M	244 255	(-12HT -1HT)
				0 12	(0 +12HT)

OSZ 1

Parameter	NRPN#	Send/Receive	Send/Receive	Data Format	Explanation
Vibrato Wave	206	S/R	Switch	0	Sine
				1	Square
				2	Random
				3	Sine/Random
Vibrato Depth	198	S/R	Pot	0...255	
Vibrato Rate	202	S/R	Pot	0 255	0,1Hz 75Hz 0,2Hz 150Hz (Wave:Random)
Env Destination/Mode	218	S/R	Switch	DDXXQMVM	Q: Quant On/Off (1/0) V: Vel On/Off (1/0) DD: Dest: 00 (Pitch) DD: Dest: 10 (Vib.Depth) DD: Dest: 11 (Noise Depth) MM: Mode: 00 (Decay Exp) MM: Mode: 10 (Decay Lin)
Envelope Depth	210	S/R	Pot	0 255	(-15HT +15HT)
Envelope Time	214	S/R	Pot	0 255	12ms 6,1S (Decay Lin/Exp) 7,5ms 3,8S (Attack/Decay)
Noise Modulation	152	S/R	Pot	0...255	
Detune	149	S/R	Pot	0...255	fine on: (-15...+15Cent) fine off: (-75...+75Cent)
Semitone	153	S/R	Pot	2,4,6,8 30	(-7HT +7HT)
Detune Fine/KBD Scale/Wave	150	S/R	Switch	KKFXXWWW	KK: Kbd Scale: 00 (Off) KK: Kbd Scale: 10 (1/4) KK: Kbd Scale: 11 (1/2) F: Fine On/Off: (0/1) WWW: Wave: 001 (Square) WWW: Wave: 010 (PW) WWW: Wave: 101 (Saw) WWW: Wave: 111 (Saw/PW) WWW: Wave: 100 (Multi PWM) WWW: Wave: 110 (Multi/PW)
Octave/Sub Octave	151	S/R	Switch	XSSSXXOO	SSS: Sub-Oct: 000 (Off) SSS: Sub-Oct: 001 (64") SSS: Sub-Oct: 010 (32") SSS: Sub-Oct: 011 (16") SSS: Sub-Oct: 100 (8") OO: Octave: 00 (32") OO: Octave: 01 (16") OO: Octave: 10 (8")
Multi PWM Diffuse/Mode	170	S/R	Switch	XXXDDXMM	DD: LFO Diffuse: 00 (Off) DD: LFO Diffuse: 10 (Slow) DD: LFO Diffuse: 11 (Fast) MM: Mode: 00 (1) MM: Mode: 01 (2) MM: Mode: 10 (3)

Multi PWM LFO Vel/Mode/Kbd	171	S/R	Switch	KKKMMMWS	KKK: Kbd Scale: 000 (Off) KKK: Kbd Scale: 110 (1/4) KKK: Kbd Scale: 111 (1/2) MMM: Mode: 001 (Decay) MMM: Mode: 101 (Attack/Deacy) MMM: Mode: 000 (LFO) MMM: Mode: 010 (Step) W: Width-LFO-Vel On/Off: (1/0)
Multi PWM Width Center	164	S/R	Pot	0..255	
Multi PWM Width Lfo Depth	167	S/R	Pot	0..255	(-Max Off +Max)
Multi PWM Width LFO Rate	166	S/R	Pot	0..255	0,025Hz 20Hz
Multi PWM Space Center	165	S/R	Pot	0..255	
Multi PWM Space LFO Depth	169	S/R	Pot	0..255	(-Max Off +Max)

VCF 1/2 DF1/2

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
LFO Source	100	S/R	Switch	DDCCBBAA	DD: 11: DF2-LFO-Sorce: LFO-DF1 DD: 10: DF2-LFO-Sorce: LFO-VCF1 DD: 01: DF2-LFO-Sorce: LFO-DF2 CC: 11: DF1-LFO-Sorce: LFO-VCF2 CC: 10: DF1-LFO-Sorce: LFO-VCF1 CC: 00: DF1-LFO-Sorce: LFO-DF1 BB: 00: VCF1-LFO-Sorce: LFO-VCF1 BB: 01: VCF1-LFO-Sorce: LFO-VCF2 BB: 11: VCF1-LFO-Sorce: LFO-VCF1+2 AA: 01: VCF2-LFO-Sorce: LFO-VCF1 AA: 00: VCF2-LFO-Sorce: LFO-VCF2

VCF 1/2

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Input Source	79	S/R	Switch	DDBCCBAA	AA: VCF1 Input A BB: VCF1 Input B CC: VCF2 Input A DD: VCF2 Input B AA/BB/CC/DD: 10: Osz1 01: Osz2 11: Osz2
Input B Filter/Level Mod	81	S/R	Switch/M	ABCDFFMM	A: VCF2-Filter Mod On/Off (1/0) B: VCF1-Filter Mod On/Off (1/0) AB Edited in Preset Menu C: VCF2-Lev.Mod Vel. On/Off (1/0) D: VCF1-Lev.Mod Vel. On/Off (1/0) FF: 00: VCF2-Lev.Mod ENV-Off FF: 10: VCF2-Lev.Mod ENV-Attack FF: 01: VCF2-Lev.Mod ENV-Decay FF: 11: VCF2-Lev.Mod ENV-LFO MM: 00: VCF1-Lev.Mod ENV-Off MM: 10: VCF1-Lev.Mod ENV-Attack MM: 01: VCF1-Lev.Mod ENV-Decay
VCF12 Decay2 On/Off	61	S/R	Switch	BAXXXXXX	B: VCF1 Decay2 On/Off (1/0) A: VCF2 Decay2 On/Off (1/0)
VCF12 LFO-Sync-Mode	31	S/R	M	BBBBAAAA	BBBB: VCF2-Sync Mode AAAA: VCF1-Sync Mode 0000 : Intern (LFO Time Pot.) 0001: Midi-Clock /32 0010: Midi-Clock /16 0011: Midi-Clock /16. 0100: Midi-Clock /8 0101: Midi-Clock /8. 0110: Midi-Clock /4 0111: Midi-Clock /4. 1000: Midi-Clock /2 1001: Midi-Clock /2. 1010: Midi-Clock /1 1011: Midi-Clock /1. 1100: Midi-Clock *2

DF1/2

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Input Source	80	S/R	Switch	DDCCBBAA	AA: DF1 Input A BB: DF1 Input B CC: DF2 Input A DD: DF2 Input B AA/BB/CC/DD: 00: Osz1 01: Osz2 10: Osz2
Resonance	131	S/R	Switch	XXBBBAAA	BBB: Reso-DF2 000..111 -> Min Max AAA: Reso-DF1 000..111 -> Min Max
ENV-Mode/DF1->2 Assign	130	S/R	Switch	XXXXXCBA	C: Assign DF1->DF2 Settings On/Off (1/0) B: ENV-Mode DF2 0:ENV 1:Ramp A: ENV-Mode DF1 0:ENV 1:Ramp

VCF1

Parameter	NRPN#	Send/Receive	Send/Receive	Data Format	Explanation
Input Level A	82	S/R	Pot	0...255	
Input Level B	83	S/R	Pot	0...255	
Input Level DF1 Out	96	S/R	Pot	0...255	
Level B Mod Time	86	S/R	Pot	0...255	ENV Attack/Decay: 12,5ms 25S ENV LFO: 40Hz 0,02Hz
Filter Mode (LP-BP-HP)	76	S/R	Pot	0 128 255	LP BP HP

Group12 Out Mix + Group12 In

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Input/output	109	S/R	Switch	GFEDCCBA	G: Input DF2-Mix A+B On/Off (1/0) F: Input DF1-Mix A+B On/Off (1/0) E: VCF2 Out-Invert On/Off (1/0) D: VCF2 Out On/Off (0/1) CC: 00: VCF3-Input : Osz1 CC: 01: VCF3-Input : Osz2 CC: 10: VCF3-Input : Osz3 CC: 11: VCF3-Input : Osz4 B: VCF1 Out-Invert On/Off (1/0)
VCF3 Group1/2 Out	110	S/R	Switch	BAXXXXX1	B: Group2 VCF3-On/Off (1/0) A: Group1 VCF3-On/Off (1/0)
DF1/2 Group1/2 Out	114	S/R	Switch	XXFEDCBA	F: Group2 DF2 Dist-Vel. On/Off (1/0) E: Group1 DF1 Dist-Vel. On/Off (1/0) D: Group2 DF2 Invert On/Off (1/0) C: Group1 DF1 Invert On/Off (1/0) B: Group2 DF2-Out On/Off (1/0)
Group1 Velocity	38	S/R	Pot	0 128 255	(-Max Off +Max)
Group2 Velocity	39	S/R	Pot	0 128 255	(-Max Off +Max)
Group1 Out DF1 Distortion	115	S/R	Pot	0 255	
Group2 Out DF2 Distortion	116	S/R	Pot	0 255	
Group1 Out DF1 Level	98	S/R	Pot	0 255	
Group2 Out DF2 Level	99	S/R	Pot	0 255	
Group1 Out VCF3 Level	111	S/R	Pot	0 255	
Group2 Out VCF3 Level	112	S/R	Pot	0 255	
VCF3 Cutoff	113	S/R	Pot	0 255	

Group 1/2 Level Mod

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Mix Man/Fade-Controls	48	S/R	Switch	XXFFMSXX	FF: 01: Fade-Mode: 2->1 FF: 11: Fade-Mode: 2->1->2 FF: 10: Fade-Mode: 2->Min->2 FF: 00: Fade-Mode: 2->Min M: Mix-Mode: Man/Fade (1/0)
Group1/2 Man-Mix	49	S/R	Pot	0 255	Group1 Group2
Group1/2 Fade-Time	50	S/R	Pot	0 255	5ms 4S (Fade-Mode 2->1,2->Min) 10ms 8S (Fade-Mode 2->1->2) 10ms 8S (Fade-Mode 2->Min->2)
Group1/2 Fade-Delay	51	S/R	Pot	0 255	0 4,5S
LFO-Controls	57	S/R	Switch	DDDRVXXX	DDD: 000: Group-Dest: Off DDD: 100: Group-Dest: 1 DDD: 010: Group-Dest: 2 DDD: 110: Group-Dest: 1+2 DDD: 111: Group-Dest: 1+ 2- R: LFO-Note-Reset On/Off (1/0)

Mix-LFO-Depth	58	S/R	Pot	0 255	
Mix-LFO-Rate	59	S/R	Pot	0 255	0 4,5S
Panorama-Controls	52	S/R	Switch	SDDVMMXD	S: Voice-Spread On/Off (1/0) DDD: 000: Group-Dest: Off DDD: 001: Group-Dest: 1 DDD: 010: Group-Dest: 2 DDD: 011: Group-Dest: 1+2 DDD: 111: Group-Dest: 1+ 2- V: LFO-Depth-Velocity On/Off (1/0) MM: 01: LFO-Mode: L>R MM: 10: LFO-Mode: L>R>L
Panorama-LFO-Depth	55	S/R	Pot	0 255	
Panorama-LFO-Rate	56	S/R	Pot	0 255	0,025Hz 10Hz (LFO-Continuous) 20S 40ms (LFO-Mode: L>R) 40S 80ms (LFO-Mode: L>R>L)
Group1 Pan-Offset	53	S/R	Pot	0 255	Left Rigth
Group2 Pan-Offset	54	S/R	Pot	0 255	Left Rigth

Master ENV/VCA-VCF12 Retrigg

Parameter	NRPN#	Send/Receive	Typ	Data Format	Explanation
Soft/VCA-VCF12-Retrigg	60	S/R	Switch	XXXXDCBA	D: VCF1-Retrigg On/Off (1/0) C: VCF2-Retrigg On/Off (1/0) B: VCA-Soft On/Off (1/0) A: VCA-Retrigg On/Off (1/0)
Sound Volume	32	S/R	Pot	0 255	
Attack	33	S/R	Pot	0 255	1ms 10ms
Decay	34	S/R	Pot	0 255	2ms 20S
Sustain	35	S/R	Pot	0 255	
Release	36	S/R	Pot	0 255	2ms 20S
Release-Level	37	S/R	Pot	0 255	

Glide/Bend

Parameter	NRPN#	Send/Receive	Send/Receive	Data Format	Explanation
Pitch Bend	148	S/R	Pot	0,1,2	(-12HT)
				3 13	(-11HT -1HT)
				14	Off
				1 28	(+1 +11HT)
				29,30,31	(+12HT)

TECHNICAL SPECIFICATIONS

Polyphony

- Eight Voices, Unisono mode, Multi mode (eight parts)

Oscillators

- Osc 1: Square (50%), PWM, SAW, Double-SAW, Noise, Multi-Pulse, additional suboscillator
- Osc 2: Square (50%), PWM, SAW, Double-SAW, Noise, Ringmod (Source Osc 3)
- Osc 3: Square (50%), PWM, SAW, Double-SAW, Noise, Sync (Source Osc 2), Sync with additional suboscillator
- Osc 4: 32 combinations of ringmodulated square-waves.

Special filter features

- VCF 1/2: 24dB Moog-style ladder filter – with additional bandpass and highpass functions
- VCF 1/2: with oscillator modulation by Osc. 1 – 4
- VCF 1/2: envelopes with double-decay feature
- DF 1/2: dual filter with oscillator modulation
- DF 1/2: distortion
- Spread-modulation of both cutoff frequencies of DF1/2 (dualfilter)

Sound memory (Singles – Multis)

- 1024 singles (8 banks / 128 singles)
- 256 multis (8 banks / 32 multis)

Real Time Controls

- Aftertouch
- Joystick (X/Y)
- Mod-Wheel
- External inputs for control voltages and/or foot pedals/switches

Inputs/Outputs

- 1 Stereo master output, stereo (jack, unbalanced)
- 8 single outputs (voice 1…8, jack, unbalanced)
- Midi In/Out/Thru, MIDI via USB
- 4 External Inputs (switching controller)
- 4 External Inputs (continuous controller)
- Stereo phones output with independent level control

Additional features

- Fatar-Keyboard 61-keys half weigthed with aftertouch
- Adjustable colors for LEDs and LC-Display
- Internal power-supply 110V/220V
- Weight: 99.2 lbs (45 Kg)
- Dimensions (inch): 44.9 x 5.5 x 24.0
  (cm) : 114 x 14 x 61

WARRANTY REGULATIONS

SERVICE AND TERMS OF WARRANTY.

Concerning service and warranty conditions, please refer to our terms of business.
You will find our terms of business at:

www.emc-de.com
EMC, Untere Bergstraße 19, D-89129 Langenau, Germany

EMC warrants, that the described product has been free of failures within parts or components of the hardware and was found to be fully functional. Please carefully read the following information, which is important in the case of probable damages or malfunctions:

If goods are being found defective, missing features described within the present documentation or becoming defective due to eventual fabrication deficiency or material defects within the first twelve months after purchase, then EMC shall at its sole discretion and evaluation replace or repair the defective parts or goods at no cost. Multiple repairs shall be permissible. In case the malfunction or physical failure can not be fixed, customer receives the right to cancel the purchase with refund of the amount originally paid for the defective product. In case testing shows no physical damages, customer will be charged for testing procedure and services.

Any deficiencies caused by transportation have to be declared within a 14 days period after receipt of goods by written notice. Please note, that any warranty repair at no cost ruled by the above regulations requires registration of name and address by sending the proof of purchase together with the defective product.

To return defective goods, please contact the retailer where you purchased the product. As an alternative you can also contact EMC directly. PLEASE NOTE: Please add a description of the failure occurred to enable us executing the repair as soon as possible.

EMC, Untere Bergstraße 19, D-89129 Langenau, Germany
phone: 049(0)7345 2381410
fax: 049(0)7345 2381411
info@emc-de.com

The hardware described within this documentation is herewith certified to conform to the requirements set forth in the guidelines for electromagnetic acceptability (89/336/EWG)

CE

DISPOSAL

This device complies to the EU guidelines and is manufactured RoHS conform without the use of led, mercury, cadmium and chrome. Still, this device is special waste and disposal in household waste is not permitted.

For disposal, please contact your dealer or:

EMC, Untere Bergstraße 19, D-89129 Langenau, Germany
phone: 049(0)7345 2381410
fax: 049(0)7345 2381411
info@emc-de.com

LEGAL DECLARATIONS

COMPLIANCE

FCC INFORMATION (U.S.A)

IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT! This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by EMC may void your authority, granted by the FCC, to use this product. IMPORTANT: When connecting this product to accessories and/ or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorisation to use this product in the USA. NOTE: This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class „B“ digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in residential environment will not result in harmful interference with other electronic devices. This equipment generates/ uses radio frequencies and, if not installed and used according to the instructions found in the user manual, may cause interference harmful to the operation of other electronic devices, Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determinated by turning the unit ”OFF“ and ”ON“, please try to eliminate the problem by using one of the following measures: Relocate either this product or the device that is being affected by the interference. Utilise power outlets that are on branch (Circuitbreaker or fuse) circuits or install AC line filter/s. In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to coaxial type cable. If these corrective measures do not produce satisfactory results, please contact the local retailer authorised to distribute this type of product. The statements above apply ONLY to products distributed in the USA.

SCHMIDT Keyboard Version 1.0 FCC Information (CANADA)
FCC INFORMATION (CANADA)
The digital section of this apparatus does not exceed the ”Class B“ limits for radio noise emmissions from digital apparatus set out in the radio interference regulation of the Canadian Department of Communications. Le present appareil numerique n’emet pas debruit radioelectriques depassant les limites applicables aux appareils numerique de la „Class B“ prescrites dans la reglement sur le brouillageradioelectrique edicte par le Ministre Des Communication du Canada. This only applies to products distributed in Canada. Ceci ne s’applique qu’aux produits distribues dans Canada

OTHER STANDARDS (REST OF WORLD)
This product complies with the radio frequency interference requirements of the Council Directive 89/336/EC.
Cet appareil est conforme aux prescriptions de la directive communitaire 89/336/EC. Dette apparat overholder det gaeldenda EF-direktivvedrorendareadiostoj. Dieses Gerät entspricht der EG-Richtlinie 89/336/EC.192

DECLARATION OF CONFORMITY
The following devices SCHMIDT Keyboard are hereby declared to conform with the requirements of Council Directive 89/336/FWG for radio frequency interference.
They also comply with regulations dated August 30th, 1995 concerning radio interference generated by electronic devices. The following standards have been applied: EM 50 082-1 : 1992 , EN 50 081-1 : 1992 , EN60065 : 1993
This declaration has been given responsibly on behalf of the manufacturer:

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THANKS TO

Stefan Schmidt:	Product conception, hard- and software design
Axel Hartmann / Designbox:	Product design
Dirk Krause, Stefan Schmidt:	Sound design
Matthias Fuchs / VISOPHON, Stephen Parsick:	User manual

IMPRINT

Manual conceived and written by Matthias Fuchs / VISOPHON, Berlin, Germany.
Edited, surveyed, brushed up, and fine-tuned into oblivion by Stephen Parsick.

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User manual vers. 1.0

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